

Petition to THE AMERICAN BOARD OF VETERINARY SPECIALTIES
For PROVISIONAL RECOGNITION
Of a RECOGNIZED VETERINARY SPECIALITY
In VETERINARY BOTANICAL MEDICINE
Under the
AMERICAN COLLEGE OF VETERINARY BOTANICAL MEDICINE (ACVBM)



This document is submitted to petition the American Board of veterinary Specialties (AVBS) and the American Veterinary Medical Association (AVMA) for provisional recognition of Veterinary Botanical Medicine as a Registered Veterinary Speciality (RVS) under the auspices of the American College of Veterinary Botanical Medicine (ACVBM), a Recognized Veterinary Speciality Organization (RVSO).

The ACVBM was formally established in 2014 following an inaugural meeting regarding its development in 2004 with a sub-committee of the Veterinary Botanical Medicine Association. The Veterinary Botanical Medicine Association has been providing an annual examination and process for industry recognition of veterinary botanical knowledge and skills since 2003. The exam is independent, as VBMA does not offer their own courses or course content. The ACVBM has been incorporated under the laws of the state of Delaware as a non-profit organization. See appendix 1(BYLAWS). The College will serve the international veterinary community and veterinarians from all countries will be invited to apply for board certification through the American College of Veterinary Botanical Medicine.

The American College of Veterinary Botanical Medicine was officially formed to meet the demands of veterinarians practicing and advising on the use of botanical medicine. It reflects the growing public demand for botanical options, increasing use by pet food companies incorporating botanicals, increasing availability of botanicals for animal use, significant research and use by the production animal industries (aquaculture, dairy, swine and poultry) and increasing use and teaching of students by university veterinary colleges faculties. Within the various special interest groups there is also an internal recognition of individual veterinarians having expertise providing teaching, referral services and consultations to other veterinarians. The growth in veterinary interest reflected by the presence of veterinary botanical medicine lectures at most major veterinary conferences and veterinary colleges represents an opportune time to take the ACVBM to the AVBS for consideration.

Our Vision

The American College of Veterinary Botanical Medicine will provide a means to reach diplomate status through maintaining a standard base of post-graduate instruction and examination, offer educational opportunities designed to advance experience and proficiency, and enhance the integration of scientific, clinical, and traditional knowledge into veterinary medicine practice for the greater benefit of the health and well-being of animals.

Our Mission

The mission of the American College of Veterinary Botanical Medicine is to increase the proficiency and competence of veterinarians in the use of medicinal plants, ultimately leading to diplomate status in the specialty of veterinary botanical medicine.

Statement of Objectives of ACVBM

The ACVBM shall promote the advancement of veterinary practice by identifying to professionals and the public those veterinarians who have voluntarily sought and obtained certification in Veterinary Botanical Medicine.

To accomplish such purposes the ACVBM shall be operated:

- 1) To establish and maintain credentialing, certification and ethical standards for veterinary practitioners who excel in botanical medicine and who shall be titled Diplomates.
- 2) To identify, develop, provide and maintain professional botanical programs, to include but not limited to phytochemistry, phytopharmacology, pharmacognosy, ethnopharmacology, and ethnoveterinary medicine.
- 3) To examine and certify veterinarians as specialists in veterinary botanical medicine and facilitate the continued professional development of the Members of the College through development and administration of continuing education programs
- 4) To promote the improvement of professional practice standards, scientific inquiry and research into the safe and effective use of botanical medicines for prevention, treatment and control of animal diseases to promote a high quality of life for companion animals and to enhance the wellbeing and productivity of livestock and other production animals.
- 5) To collaborate with veterinary colleges and other educational institutions that relate to veterinary medicine to encourage and promote the development of graduate veterinary botanical medicine programs, especially in regard to residency training for clinical practice.
- 6) To identify Diplomates to the public, professionals, other professional organizations and government agencies and other appropriate individuals and bodies.

Scientific Basis of Proposed Specialty

The scientific basis of veterinary botanical medicine includes, but is not limited to,

- The pharmacological basis of herbal medicines.
 - The practice of botanical medicine incorporates complex substances, some of which are well understood in pharmacologic terms, and some of which are more nutritional in action. In addition, the science of pharmacognosy recognizes the inspiration for research into the actions of plant drugs as arising from traditional use, rather than from the evolving knowledge of molecular structure and function.
 - There are over 143000 published journal articles on plant extracts of which there are over 7000 Systematic Reviews or reviews. An example of the extensive work done in one relevant area of animal agriculture can be found in a 2016 review entitled *Herbal Remedies for Coccidiosis Control: A Review of Plants, Compounds, and Anticoccidial Actions.*". This paper details recent advances in the use of anticoccidial phytoextracts and phytocompounds in poultry and the review covers 32 plants and 40 phytocompounds, their biologic actions, mechanisms and prophylactic/therapeutic potential of the compounds¹. Another example can be found in a 2015 review of the possible pharmacologic basis for the action of herbal medicines in the treatment of epilepsy, which indicates that hundreds of plants have been screened for anti-convulsant activity, with dozens of compounds exhibiting anticonvulsant activity equivalent to that of anticonvulsant drugs. These actions have been well characterized at the receptor level. In addition many complex extracts and single plant-derived compounds exhibit

¹ Muthamilselvan T, Kuo TF, Wu YC, Yang WC Herbal Remedies for Coccidiosis Control: A Review of Plants, Compounds, and Anticoccidial Actions. Evid Based Complement Alternat Med. 2016;2016:2657981

antiinflammatory, neuroprotective, and cognition-enhancing activities that may be beneficial in the treatment of epilepsy².

Veterinarians need to be aware of herb drug interactions and safety of herbs supported by published literature, including toxicology

- Manufacture, quality control and regulatory aspects of botanical medicines, standardization of products via the United States Pharmacopeia (USP) and National Formulary (NF) guarantees that the active constituent found in a botanical medicine remains at uniform concentration from batch to batch.
- Pharmacognosy
 - Each plant medicine has multiple constituents, each constituent can bind to different targets; this branch of herbal medicine is the systematic science of morphological, chemical, and biological properties along with the history, cultivation, collection, extraction, isolation, bioassaying, quality control and preparation of crude drugs of natural origin. Approximately 25% of the prescription drugs dispensed in the USA contain at least one active ingredient of plant origin⁴; empirical herbal medicine use in veterinary medicine has led to research which can produce new treatments including herbal formulas for common conditions such as atopy⁵.
- Zoopharmacognosy, Ethnobotanical and Ethnoveterinary medicine
 - Veterinary herbalists must be aware of the traditional uses of plant medicines as these uses are in the public domain and remain the basis for use. In addition, there is clear evidence of “medicine-seeking” by animals in the wild (zoopharmacognosy), which may assist veterinarians who treat wild animals.
 - Principles of botanical medicine respect tradition as a source of empirical evidence which frequently informs research. The study of traditional use of plant medicines within a culture is termed ethnobotany, and the study of traditional medicines is known as ethnomedicine, or ethnoveterinary medicine. Research may validate traditional uses. An example of a traditional principle is that of synergy- combining herbs into formulas rather than using single herbs to achieve better patient outcomes⁶. A recent 2016 Review⁷ titled *Favorable results from the use of herbal and plant products in inflammatory bowel disease: evidence from experimental animal studies* stated that in the majority of studies herbal therapy reduced the inflammatory activity of experimental colitis and diminished the levels of many inflammatory indices, including serum cytokines and indices of oxidative stress. The herbs examined in the studies were ones derived from ethnomedical use in humans but applied to animal models where mechanisms of action could be understood.

² Sucher N, Carles M A pharmacological basis of herbal medicines for epilepsy *Epilepsy Behav* 2015 Nov 52(PtB) 308-18

⁴ Ahmad I, Aqil F, Owais M. *Modern Phytomedicine: Turning Medicinal Plants into Drugs*. Weinheim: Wiley-VCH. 2006.

⁵ Schmidt V¹, McEwan N, Volk A, Helps J, Morrell K, Nuttall T. The glucocorticoid sparing efficacy of Phytopica in the management of canine atopic dermatitis. *Vet Dermatol*. 2010 Feb;21(1):96-105.

⁶ Yang Y, Zhang Z, Li S, Ye X, Li X, He K. Synergy effects of herb extracts: pharmacokinetics and pharmacodynamic basis. *Fitoterapia*. 2014 Jan;92:133-47.

⁷ Triantafyllidis JK, Triantafyllidi A, Vagianos C, Papalois A. Favorable results from the use of herbal and plant products in inflammatory bowel disease: evidence from experimental animal studies. *Ann Gastroenterol*. 2016 Jul-Sep;29(3):268-81.

- Detailed knowledge of plant medicines
 - Veterinary herbalists are skilled in plant taxonomy and identification. This skill is unique to herbalists and important to ensure that the correct species of plant is used in herbal products.
 - Veterinary herbalists have in-depth knowledge of combinations of plant species with their expected therapeutic actions, contraindications, herb drug interactions and dosing. This includes the species, constituents, actions, uses, research, doses and application of each botanical medicine or formula.
 - Veterinarian herbalists understand the dosing of herbs because of the variability of the plant medicines and clinical and patient related factors affecting dosing of botanical medicines. The herbal medicines are variable in form and concentrations and bioavailability; knowing how to relate research to the form of herb is important for efficacy and safety. This is distinct from use of drugs with more consistent formulations, but also distinct from the science of clinical nutrition where food ingredients are generally safer than herbal drugs.
- Principles of botanical medicine
 - This is the application of plant based medicine (supported by science and/or traditional use) to conventional diagnosis, multiple diagnoses and complex cases and to address individual signs and problem lists; or for prevention of disease by protecting organ health and /or optimizing animal health through actions not available with conventional drugs. An example is the use of *Sylibum marianum* as a hepato-protective herb and the source of silibin⁸. Another is *Coriolus versicolor* as a source of immune regulating polysaccharides to potentially improve quality of life in canine patients with hemangiosarcoma⁹;
 - The term ‘rational phytotherapy’ has come into use over the last two decades- this is a scientific, evidence-based system that encourages *in vitro* and *in vivo* studies to explain mechanisms of action, pathophysiology, pharmacokinetics and bioavailability as well as efficacy.
- Ethical and regulatory aspects of practicing botanical medicine including conservation and avoiding endangered species; and avoidance of use of botanical medicines which can be detected in drug testing in performance animals

Relationship to Veterinary Medical Curricula

The basic principles underlying herbal medicine including anatomy, physiology, pathophysiology and pharmacology are taught in the professional curriculum however herbal medicine is often left to electives. A survey of the AVMA-accredited veterinary institutions (Memon and Sprunger, 2011) reported that 16 (47%) out of 34 respondent colleges offered a complementary and alternative medicine (CAVM) course and herbal therapy was one of the most common topics included in the curricula. The 18 colleges without any course in CAVM or Integrative Veterinary Medicine (IVM) reportedly addressed these topics in other courses, and 4 indicated plans to offer a dedicated CAVM course within the next 5 years¹¹. The same

⁸ Webster CR, Cooper J. Therapeutic use of cytoprotective agents in canine and feline hepatobiliary disease. *Vet Clin North Am Small Anim Pract.* 2009 May;39(3):631-52.

⁹ Brown DC, Reetz J. Single agent polysaccharopeptide delays metastases and improves survival in naturally occurring hemangiosarcoma. *Evid Based Complement Altern Med* Vol 2012, Article ID 384301 8pages

¹¹ Memon, M.A. and Sprunger, L.K. 2011. Survey of colleges and schools of veterinary medicine regarding education in complementary and alternative veterinary medicine. *J. Am. Vet. Med. Assoc.* 239, 619-623.

survey noted that two-thirds of one school's veterinary graduates encountered clinical situations involving these therapies at least monthly and over 25% experienced them on a weekly or daily basis¹².

Since then the University of Florida now includes an integrative veterinary medicine focus; Washington State University has included invited speakers in its CAVM course to expand its training in this area. Louisiana State University has recently hired a faculty member to offer clinical services and teaching in CAVM, and the University of California-Davis expanded a rehabilitation service to include integrative medicine. Colorado State University continues to provide training in CAVM. Faculty members at a number of other accredited institutions without dedicated clinical programs have obtained training including botanical medicine¹³.

In addition Cornell University provides the DeeDee Arrison Holistic and Integrative Wellness lectures each year to faculty and students that include herbal medicine; North Carolina State University, Texas A&M University, University of Minnesota, University of Montreal, University of Pennsylvania, University of Prince Edward Island and Auburn Veterinary School have specifically included some herbal medicine training or electives for students. It has recently been proposed in 2016 consensus guidelines for an integrative veterinary medicine curriculum within veterinary colleges that botanical medicine including the origins and major systems of herbal therapy, selected evidence based interventions, adverse events, herb drug interactions and supplement evaluation and regulation form part of the curricula for veterinary students¹⁴.

Recently a Retrospective Analysis of 5,195 Patient Treatment Sessions in the Integrative Veterinary Medicine Service at the College of Veterinary Medicine, University of Florida demonstrated that 8.3% (431) of patients received herbal medicine in a 400 day period¹⁵.

Members of the Veterinary Botanical Medicine Association and AHVMA were surveyed by the ACVBM organizing committee 2016 and those members nominated they provided the following externships for veterinary students from local veterinary schools:

- Cornell University 3 students per year
- Ross Mississippi State 8 students per year
- Ohio State 4 students yearly
- Blue Pearl Georgia Veterinary Specialists 10 interns per year
- Kansas State University 1 student per year
- Virginia Maryland 1 every few years
- University Florida 1 per year
- Iowa State 1 per year
- Ontario Veterinary College 2 per year
- UC Davis 6 students per year
- Oregon State University 2-3 per year

¹² Memon, M.A. and Sprunger, L.K. 2011. Survey of colleges and schools of veterinary medicine regarding education in complementary and alternative veterinary medicine. *J. Am. Vet. Med. Assoc.* 239, 619-623.

¹³ Memon MA, Shmalberg J, Adair HS et al Integrative veterinary medical education and consensus guidelines for an integrative veterinary medicine curriculum within veterinary colleges *Open Veterinary Journal*, (2016), Vol. 6(1): 44-56

¹⁴ Memon MA, Shmalberg J, Adair HS et al Integrative veterinary medical education and consensus guidelines for an integrative veterinary medicine curriculum within veterinary colleges *Open Veterinary Journal*, (2016), Vol. 6(1): 49

¹⁵ Shmalberg J, Memon MA A Retrospective Analysis of 5,195 Patient Treatment Sessions in an Integrative Veterinary Medicine Service: Patient Characteristics, Presenting Complaints, and Therapeutic Interventions *Veterinary Medicine International Volume 2015*, Article ID 983621, 11 pages

- Purdue and Ross University 1-2 students per year
- Western University 1-2 students per year
- University of Guelph 4th year students 20 per year
- Oklahoma State University 2 students per year
- Mid Western University Arizona 10-12 students per year
- Washington State 1-3 students per year
- Atlantic Veterinary College 1-3 students per year

While the training is basic for veterinary students, advanced training is usually acquired after graduation through the availability of industry recognised courses and post graduate qualifications (see Continuing Education Programs) in herbal medicine or through attendance at conferences offering in-depth coverage of these areas.

Employment of Diplomates

It is estimated that about 100 diplomates will be employed in specialty private practices and integrative practices in the US. In academic institutions, it is estimated that 30 diplomates will be employed in teaching and research positions. In industry, it is anticipated that large pharmaceutical companies and pet food companies may employ diplomates as consultants, providing jobs for up to 30 diplomates.

Continuing Education Programs

Current Programs available in Veterinary Herbal Medicine specifically
VIN

- 16 hours Intermediate Herbal Medicine
- 12 hours Introduction to Herbal Medicine
- 10 hours Introduction to Veterinary Chinese Herbal Medicine
- 6 hours Using herbs for Liver and Kidney Disease

Chi

- 150 hour Chinese Veterinary Herbal Medicine Program approved by a majority of state boards, Provides training Veterinary Chinese Herbalist and this contributes towards Masters TCVM.

IVAS

- 165 hours Veterinary Chinese Herbal Medicine training
- 500 hours Advanced Veterinary Chinese Herbal Medicine training

CIVT

- 1305 hours Graduate Diploma Veterinary Chinese Herbal Medicine (Grad Dip VCHM) accredited post graduate degree competency based training
- 945 hours Graduate Diploma Veterinary Western Herbal Medicine (Grad Dip VWHM) accredited post graduate degree competency based training
- 500 hours Foundation Course in Western Veterinary Herbal Medicine
- 445 hours Advanced Western Veterinary Herbal Medicine
- 120 hours Foundation Course Veterinary Chinese Herbal Medicine
- 40 hours Getting Started Veterinary Chinese Herbal Medicine Introductory course
- 24 hours Essentials of Western Veterinary Herbal Medicine

There are conferences and sections within conferences devoted to botanical medicine (The Chi Institute, Veterinary Botanical Medicine Association, AHVMA and American College Veterinary Botanical Medicine). In addition, there are scientific sessions devoted to botanical medicine at the major veterinary medical meetings, such as NAVC, WSAVA, Atlantic Coast Vet Conference, Wild West Veterinary Conference, Western Veterinary Conference, American College Veterinary internal Medicine Forum and American Association of Feline Practitioners. As well Diplomates from many different specialties speak on the use of herbal medicine within their specialties including Oncology, Sports Medicine, Nutrition, Behavior, Dermatology, Exotics, Avian, Internal Medicine, Hospice and Palliative Care, Dairy Cattle and others.

A Sample of Conference titles by Diplomates or academics in the last 5 years that have herbal therapies included in the speakers proceedings:

- **NAVC 2016** Justin Shmalberg, DVM DACVSMR DACVN College of Veterinary Medicine University of Florida, Gainesville, FL Acupuncture and Herbs in Sports Medicine and Rehabilitation
- **NAVC 2016** Theresa DePorter, BS, DVM, DECAWBM, DACVB Use of Nutraceutical and Botanical Therapies To Modify Behavior
- **NAVC 2016** Gary Landsberg BSc, DVM, DACVB, DECAWBM A Behaviorist's Guide To Natural Therapeutics
- **NAVC 2015** Gregory K. Ogilvie, DVM, DACVIM (Internal Medicine, Oncology), DECVIM-CA (Oncology) Top Ten Natural Cancer Therapies: Banerji and Beyond
- **NACV 2015** Douglas J. DeBoer, DVM, DACVD Global Innovations in Dermatology includes a discussion on herbal oils.
- **NAVC 2015** David C. Twedt, DVM, DACVIM Colorado State University Fort Collins, CO Do Supplements Have a Role in the Support of Gastrointestinal and Hepatic Health?
- **Pacific Veterinary Conference 2015** Leah A. Cohn, DVM, PhD, DACVIM (SAIM) Respiratory Diagnostic Testing: Aspirates, Lavage, and More discusses the adjunctive use of Yunnan baiyao.
- **Pacific Veterinary Conference 2015** Peter G. Fisher, DVM, DABVP (Exotic Companion Mammal) Exotic Companion Mammal Dermatological Disease includes the use of herbal therapy.
- **Pacific Veterinary Conference 2015** M. Christine Zink, DVM, PhD, DACVP, DACVSMR, CVSMT Integrative Medicine for the Canine Athlete includes use of herbal therapy.
- **Pacific Veterinary Conference 2015** Michael D. Willard, DVM, MS, DACVIM (SA) Chronic Hepatic Diseases in Dogs discusses silymarin.
- **Atlantic Coast Veterinary Conference 2015** Beth Overley-Adamson, VMD, DACVIM (Oncology) Updates in Oncology discusses reasonable use of integrative medicine.

- **ACVIM 2014** K. Loyd DACVIM et al *In Vitro* Effects of Yunnan Baiyao (Yb) on Coagulation College of Veterinary Medicine, University of Missouri, Columbia, MO, USA, states that YB is a complex herbal remedy used in veterinary medicine to promote hemostasis.
- **ACVIM 2013** S M Boothe DVM, PhD, DACVIM, DACVCP Nutraceuticals and Drug Interactions provides examples of potential herb drug interactions.
- **International Association of Animal Hospice and Palliative Care 2013** Bonnie Wright, DVM, DACVA, cVMA, CVPP, CCRP Pain Management in Hospice and Palliative Care includes herbal supplements.
- **Central Veterinary Conference 2013** Professor Pamela L. Ruegg, DVM, MPVM University of Wisconsin, Madison, WI, USA Treatments Used on Organic Dairy Herds presented information on the use of alternatives including herbal medicines in organic dairy farms.
- **Central Veterinary Conference 2013** - Kansas City Michael O. Childress, DVM, MS, DACVIM Complementary and Alternative Medicine for Veterinary Cancer Patients: What You and Your Clients Should Know discusses herbal medicines.
- **Central Veterinary Conference 2013** - Washington DC Kendall Taney, DVM, DAVDC Fundamentals of Oral Oncology discusses adjunctive therapy with herbs.
- **Veterinary Cancer Society Conference 2013** Dr. Brian Husbands, DVM, Diplomate ACVIM, CVA East Meets West, an Introduction to Integrative Veterinary Oncology
- **ABVP 2013** Kevin Wright, DVM, DABVP Liver Disease in Reptiles discusses herbs as options for treatment
- **NAVC 2013** Gary P. Oswald, DVM, MS, DACVIM (Internal Medicine) rug and Nutraceutical Therapy of Chronic Inflammatory Liver Disease
- **NAVC 2013** Justin Shmalberg, DVM, DACVN College of Veterinary Medicine University of Florida, Gainesville, FL Beyond Yunnan Baiyao: The Safety, Nutritional Considerations, and Efficacy of Chinese Herbal Products
- **NAVC 2013** Assoc. Professor R.M. Clemmons, DVM, PhD SACS/College of Veterinary Medicine University of Florida, Gainesville, FL TCVM Treatment of Intervertebral Disk Disease and Spinal Cord Neoplasia
- **NAVC 2013** Assoc. Professor R.M. Clemmons, DVM, PhD SACS/College of Veterinary Medicine University of Florida, Gainesville, FL CVM Treatment of Megaesophagus
- **ACVIM 2012** Frank M. Andrews, DVM, MS, DACVIM Gastric Ulcers in Horses: Pharmacologic and Management Strategies included a discussion on research on Sea Buckthorn berry extract for the treatment and prevention of gastric ulcers in horses.
- **IAAAM 2012** Bethany M. Doescher et al College of Veterinary Medicine, University of Georgia, Athens, GA, USA Serenin VetTM, A Natural Alternative Supplement, Used as an Adjunct for

Marine Mammal Behavior Modification. This supplement includes three major medicinal herbs used in veterinary herbal medicine.

- **64th Convention of the Canadian Veterinary Medical Association, 2012** Assoc Professor Art Ortenburger, DVM Department of Health Management, University of Prince Edward Island, Charlottetown, PE, Canada Integrative Medicine Approach to Common Clinical Problems in Large Animals
- **Western Veterinary Conference 2012** Jacquelin J. Boggs, DVM, MS, DACVIM (LAIM) Complementary, Not Alternative? A Practical Review of Non-Western Medicine
- **Atlantic Coast Veterinary Conference 2011** Kristina R. Vygantas, DVM, DACVO Frequently Asked Questions: Conjunctiva and KCS includes *Calendula officinalis* for conjunctivitis.
- **AAV 2011** Vanessa L. Grunkemeyer, DVM, DABVP (Avian) Avian Integumentary Wound Healing and Management Techniques Discusses Yunnan Bai Yao
- **ACVIM 2011** E. Carothers et al Comparison of a Proprietary Herbal Topical Cream to Silver Sulfadiazine in an Equine Wound Model Department of Clinical Sciences, College of Veterinary Medicine, Mississippi State, MS, USA, in which the topical treatment was effective.
- **ACVIM 2011** Mark E. Peterson, DVM, DACVIM Methimazole, Carbimazole & Alternative Medical Therapies for Feline Hyperthyroidism
- **Western Veterinary Conference 2011** Meri Stratton-Phelps, DVM, MPVM, DACVIM (LAIM), DACVN Making Nutrition A Profitable Part of Your Practice horse food and herbs.
- **Western Veterinary Conference 2011** Francis W.K. Smith Jr., DVM, DACVIM (SAIM & Cardiology) Complementary Therapies for Cardiac Diseases discusses a group of herbal therapies for heart disease.
- **Atlantic Coast Veterinary Conference 2010** Emily D. Levine, DVM, MRCVS, DACVB Noise Fears, Sensitivities, and Phobias includes reference to herbal therapies.
- **Atlantic Coast Veterinary Conference 2010** Michael Willard, DVM, MS, DACVIM Chronic Hepatobiliary Diseases of Dogs includes reference to Milk Thistle.

A Sample of Conference titles discussed by veterinary herbalists in the last 5 years that have herbal therapies included in the speakers proceedings:

- **Western Vet Conference : WVC 2016.** Ihor Basko Medical Mushrooms to Treat Cancer
- **Western Vet Conference : WVC 2016.** Nancy Scanlan Herbs for Immune System and Cancer
- **Wild West Veterinary Conference 2016** Rob Silver Applications of Cannabinoid Therapies for Geriatric Conditions
- **Wild West Veterinary Conference 2016** Rob Silver Chronic Kidney Disease- an Integrative Approach
- **Wild West Veterinary Conference 2016** Rob Silver Cannabis for Cancer?
- **Wild West Veterinary Conference 2016** Gregg Todd Applying Traditional Chinese Veterinary Medicine in Respiratory Disease Treatment
- **Wild West Veterinary Conference 2016** Gregg Todd The Treatment of Musculoskeletal Disease Utilizing Traditional Chinese Veterinary Medicine.
- **Wild West Veterinary Conference 2016** Gregg Todd How to Approach Dermatological Cases with Traditional Chinese Veterinary Medicine.
- **Wild West Veterinary Conference 2016** Gregg Todd Common behavior patterns: Their Diagnosis and Treatment with Traditional Chinese Veterinary Medicine.
- **NAVC 2016** Huisheng Xie A Severe Atopic Dog, A TCVM Approach
- **NAVC 2016** Huisheng Xie Non-controlled Seizure Dog: A TCVM Approach
- **NYSVC 2016** Barbara Fougere The Evidence Base for Veterinary Herbal Medicine
- **NYSVC 2016** Barbara Fougere Herbal Oncology I
- **NYSVC 2016** Barbara Fougere Herbal Oncology II
- **NAVC 2015** Steve Marsden Integrative Management of Systemic Lupus in a Dog
- **NAVC 2015** Steve Marsden Integrative Management of Musculoskeletal Disorders
- **NAVC 2015** Steve Marsden Integrative Neurology: Disorders of the Back and Hind Limbs
- **WSAVA 2015.** X. Huisheng Traditional Chinese Veterinary Medicine for Renal Failure
- **WSAVA 2015.** S.H. Xie Traditional Chinese Veterinary Medicine for Itching Dogs
- **WSAVA 2015.** B. Fougere How Do Herbs Work? An Introduction to Herbal Modes of Action and Use
- **WSAVA 2015.** B. Fougere Veterinary Herbal Medicine - Where's the Evidence?

- **NAVC 2014** Huisheng Xie, DVM, PhD College of Veterinary Medicine University of Florida, Gainesville, FL Treatment of Icterus / Hepatitis
- **NAVC 2014** Huisheng Xie, DVM, PhD College of Veterinary Medicine University of Florida, Gainesville, FL How To Use TCVM for the Treatment of Seizures
- **NAVC 2014** Constance DiNatale, DVM Cancer and Immune Dysfunction
- **NAVC 2014** Constance DiNatale, DVM TCVM Approach To Skin Case
- **NAVC 2014** Nancy Scanlan, DVM How Some "Immune Boosters" Really Work and How Best To Use Them
- **Atlantic Coast Vet Conference : ACVC 2014.** Robert J. Silver Integrative Oncology
- **Atlantic Coast Vet Conference : ACVC 2014.** Robert J. Silver Introduction to Veterinary Nutraceuticals
- **Atlantic Coast Vet Conference : ACVC 2014.** Robert J. Silver Using Nutraceuticals to Maintain Quality of Life in Pet Hospice
- **Atlantic Coast Vet Conference : ACVC 2014.** Robert J. Silver An Overview of Integrative Veterinary Medicine
- **Wild West Veterinary Conference 2013** Gregory Todd A Traditional Chinese Veterinary Medical Approach to Neoplastic Disease
- **Wild West Veterinary Conference 2013.** Gregory Todd Immunology: A Traditional Chinese Veterinary Medicine Perspective
- **Wild West Veterinary Conference 2013.** Gregory Todd The Basic Principles of Cardiology in Traditional Chinese Veterinary Medicine
- **Wild West Veterinary Conference 2013.** Gregory Todd Diagnosis and Treatment of Common Gastrointestinal Patterns in Traditional Chinese Veterinary Medicine
- **Western Vet Conference : WVC 2013.** J. Randy Kidd Herbal Medicines for Animals
- **Am College Vet Internal Med Forum : ACVIM 2013.** Martha F. Mallicote Acupuncture and Herbal Medicine Used for Treatment of Anhidrosis
- **UC Davis 2013.** Madeline S. Yamate Managing Geriatric Patients with Traditional Chinese Medicine
- **Am Assoc Feline Practitioners : AAFP 2012.** Steve Marsden Perspectives on Feline Hyperthyroidism: Speculated Pathogenesis & Herbal Treatment
- **Am Assoc Feline Practitioners : AAFP 2012.** Steve Marsden Herbal Management of Feline Chronic Vomiting & Inflammatory Bowel Disease
- **Am Assoc Feline Practitioners AAFP 2012.** Robert J. Silver Introduction to the Clinical Use of Nutraceutical and Botanical Therapies

- **Western Vet Conference : WVC 2012.** Deborah M. Mitchell TCVM Diagnosis and Treatment of Seizures
- **Western Vet Conference : WVC 2012.** Deborah M. Mitchell Do the Symptoms Match the Picture? TCVM Approach to Skin Disease
- **Canadian Vet Med Assoc : CVMA 2012.** Deborah M. Mitchell Integrative Medical Approach to Common Clinical Problems in Small Animals
- **Western Vet Conference : WVC 2011.** Signe E. Beebe Chinese Medicine Approach to Feline Chronic Renal Failure
- **Western Vet Conference : WVC 2011.** Signe E. Beebe Chinese Herbs to Treat Endocrine Disorders I and II
- **Western Vet Conference : WVC 2011.** Signe E. Beebe Integrative Cancer Therapies I and II
- **Wild West Veterinary Conference 2011** Cindy Wallis The Use of Chinese Herbal Medicine to Treat Cancer in Dogs
- **Wild West Veterinary Conference 2011.** Cindy Wallis Chinese Herbal Medicine for Inflammatory Bowel Disease
- **Wild West Veterinary Conference 2011.** Cindy Wallis How to Use Chinese Herbal Medicine
- **UC Davis 2011.** Michael Salewski Performance: Strategies for Animal Athletes

Relationships with Existing RVSOs and the Uniqueness of Veterinary Medicine Specialty.

Botanical medicine overlaps and integrates with many specialties as herbs can fill therapeutic “holes” in the veterinarian’s treatment armamentarium. For instance, there are many plants used as traditional “tonics”, intended to invigorate normal organ functions. While some of these traditional tonics and alteratives have recognized activities, such as antioxidation or microbiome support, some are still not well enough understood to classify them in a physiologic or pharmacologic sense. Herbal antimicrobials are being investigated as alternatives to conventional antibiotics due to increasing antimicrobial resistance. The use of herbs is especially intriguing where clinical proof of efficacy predates our understanding of disease pathophysiology, illustrated in a recent review showing herbs and plant therapy are efficacious for IBD in human patients¹⁶.

Specialists in canine, feline, and avian practice encounter questions about herbal therapies from their clients frequently. Among veterinarians who offer botanical medicine, herbs are recommended for patients also being concurrently treated by oncologists, internists, surgeons, physical therapy/rehabilitation and reproductive specialists, ophthalmologists, cardiologists, neurologists, behaviorists and dermatologists. Dairy, beef, swine, poultry and food animal specialists may depend upon herbal therapies for the treatment of animals raised for organic food. Plant-based medicines impact the

¹⁶ Triantafyllidi A, Xanthos T, Papalois A, Triantafyllidis JK Herbal and plant therapy in patients with inflammatory bowel disease. *Ann Gastroenterol.* 2015 Apr-Jun;28(2):210-220.

practice of anesthesiology, pharmacology and toxicology and even comprise some of the training for these specialties. Herbal therapies hold potential in the treatment of infectious disease, and therefore impact the bacteriology/mycology, microbiology, parasitology and immunology specialties, as well.

However, while botanical medicine overlaps many other specialties, the depth of knowledge required of a specialist in phytopharmacology and phytomedicine is not covered by any of these. Even the pharmacology College, which might be the closest relation of all the specialties, would concentrate on only a subset of the mechanisms by which herbs work. There are tens of thousands of medicinal plants described in the herbal medicine literature, likely overshadowing the conventional drug pharmacopeia by orders of magnitude. Pharmacology focuses on isolation of a single constituent to characterize and use therapeutically. By contrast, herbalists advocate for the complex actions initiated when a plant or plant extract containing hundreds of compounds – both nutritional and pharmacologic – are in play. In addition, the discovery process for drugs and herbs differs widely. New drugs are more often designed through the theoretical knowledge of physiologic mechanisms as they are by accident. The effective use of herbal medicine often requires knowledge of their ethnobotanical medical uses - or familiarity with the culture and medical system that popularized the use of a medicinal plant. Ethnobotanical medicine is a specific subspecialty with increasing numbers of peer reviewed publications, and could be supported and explored adequately only if herbal medicine stands alone as a specialty.

No other specialty possesses the unique set of skills and knowledge required by herbal medicine practice. If herbal medicine became a subspecialty of pharmacology or any other RVS, too much additional knowledge and experience would be required of diplomat. An even larger concern is the dilutional effect that training in the other RVS plus herbal medicine would have on the practice of herbal medicine.

There are relationships and commonalities between veterinary botanical medicine and the following RVSOs:

American Board of Veterinary Practitioners: general practitioners may treat patients with chronic, recurrent disease where conventional therapies have been exhausted or are contraindicated. The herbal medicine specialist may act as a consultant by virtue of his or her detailed knowledge of herbal medicine principles, medicines and therapeutic strategies that can be used in an integrative manner or instead of conventional drugs, and to help prevent disease.

American Board of Veterinary Toxicology: Toxicologists are familiar with toxic principles of plants. Many of the plants that are considered toxic by toxicologists are also considered therapeutic by botanical medicine specialists, who are necessary to provide this complementary information on plant use and abuse. Herbal medicine specialists will be more informed on dosing that “makes the medicine or the poison”. The botanical medicine diplomate can also provide information on botanical support for animals that are poisoned such as *Silybum marianum* for amanita poisoning and also provide input into reducing the toxicity of certain drugs- such as *Silybum marianum* providing a protective effect against gentamycin induced toxicity.

American College of Laboratory Animal Medicine: There exists a large body of literature examining the effects of herbal medicines in experimental animals, and research in animal models is fundamental to human studies in herbal medicine. The botanical medicine diplomate can advise on suitable dosages of herbs and plant constituents and appropriate herbs the conditions being investigated based on herbal medicine principles and ethnobotanical information.

American College of Poultry Veterinarians: There is increasing research on the use of herbs and plant extracts in poultry production although most poultry veterinarians do not identify with herbal medicine

use. The botanical medicine diplomate can act as an interface between industry research and clinical medicine and advice on potential treatment of diseases, prevention of disease and also in treatment of backyard chickens.

American College of Theriogenologists: Reproduction and fertility is an area of specific research in human herbal medicine and increasing publication in veterinary medicine. This is represented by Dr Reed Holyoak DVM, PhD, DACT Professor of Theriogenology, OK State Univ who incorporates botanical medicine in the treatment of reproductive and fertility issues in horses. He teaches veterinarians in the use of plants, but as in every other facet of medicine, this is a mere introduction to a larger field that requires additional training in order to make competent use of it.

American College of Veterinary Anesthesia and Analgesia. Some herbs have the potential to interact with anaesthesia. With increasing use of herbs by the public the botanical medicine diplomate can advise on use, research topics and the benefits of using some herbs in conjunction with anesthesia as well as input into the potential for herbs and plant extracts such as cannabis for analgesia. The botanical medicine diplomat would serve as a resource to anesthesiologists and veterinarians as pet owners continue to find and administer new over the counter herbal supplements to their animals.

American College of Veterinary Behavior: Because herbal remedies are already available to the public, veterinarians are frequently consulted about the value of herbal anxiolytics, sedatives, and antidepressants even while lay dog trainers recommend them routinely. The botanical medicine diplomate can support veterinary behaviourists in having more in-depth knowledge about these over-the-counter remedies and how they will interact with pharmacologic interventions. The veterinary botanical specialist may also advise or be involved in research on herbs and plant extracts that have potential use in a number of clinical conditions associated with behavioural issues. Veterinarians are already utilising herbal training to inform research directions for companies investigating herbal alternatives to drugs for companion animals.

American College of Veterinary Clinical Pharmacology: An important basis of herbal medicine is the pharmacology and mechanisms of actions of plants and plant extracts, however they differ from drugs in their complexity, and in the underlying ethnomedical knowledge base used to prescribe them.. The botanical medicine diplomate can provide context to client and referring veterinarian inquiries, both ethnobotanical and scientific. The botanical medicines specialist might also collaborate with veterinary clinical pharmacologists on research design, herb-drug-nutrient interactions and other clinical issues.

American College of Veterinary Dermatology: Studies have shown that people seek complementary and alternative therapies for (among other things) relief of chronic discomfort, and chronic dermatologic disorders (especially allergies) that prove difficult to resolve comprise a major proportion of cases seen by general practitioners and Dermatology specialists. Veterinary herbalists are presented with a large proportion of chronic dermatological conditions that are poorly responsive to conventional treatment or where pet owners seek other options. Many herbs and formulas have the potential to improve patient quality of life and the herbal medicine diplomate can be involved in directing research in this area and working together on challenging cases. Some diplomate dermatologists have been trained in herbal medicine.

American College of Veterinary Internal Medicine: Metabolic diseases are common in equine and small animals. The herbal medicine diplomate will be trained to apply herbal medicine strategies and integrative medicine for chronic metabolic disorders where conventional treatment may not be successful or where herbal medicine can augment medication or protect from side effects or sequelae of the disorder.

Botanical medicine diplomats would act as important consultants in the design of clinical trials that incorporate herbal therapies.

American College of Veterinary Nutrition: Functional foods including herbal medicines are being employed in therapeutic diets and products in veterinary medicine. The herbal medicine diplomate will be able to advise on suitable herbs to meet therapeutic needs in product development in the pet food industry and also provide advice on the addition of herbs to diet plans and critical care nutrition to benefit the patient therapeutically.

American College of Veterinary Ophthalmology: Diseases which are refractory to conventional medicine or progressive in nature can be attenuated by herbal medicines and plant extracts. A botanical medicine diplomate can advise on research and treatment on challenging cases and product development. Some therapeutic products containing herbs have been developed by a ACVO Diplomate Dr Carmen Colitz, DVM, PhD.

American College of Veterinary Preventive Medicine: In the field of production animals, environmental health, and antibiotic resistance, the botanical medicine diplomate can provide advice on research, potential for residues and appropriate herb use to improve public health and food safety especially in the areas of organic production.

American College of Veterinary Sports Medicine and Rehabilitation: The botanical medicine diplomate can advise on appropriate herbal medicine use to support rehabilitation of patients and avoiding herb and plant extract doping of performance animals.

American College of Zoological Medicine: The botanical medicine diplomate can advise on appropriate treatment strategies for challenging cases in zoo medicine. Herbal medicine diplomats will be familiar with the zoopharmacologic, ethnoveterinary and ethnobotanical research related to the animal's geographic and cultural background, providing potentially more scientifically supported herbal therapies.

American College Veterinary Emergency & Critical Care: The botanical medicine diplomate can provide advice on integrative treatment of critical care cases where options may be limited such as acute liver and kidney failure which may benefit from the addition of botanical medicine. The formula Yunnan baiyao is already being used in critical care practice and warrants further research¹⁷.

American Veterinary Dental College: A number of veterinary dental products contain essential oils and herb extracts and research in human dentistry includes research on herbs often using dogs as models. Having the link between botanical medicine and dentistry might accelerate preventative medicine in one of the most common disorders of small animals.

INDUSTRY AND PROFESSIONAL SUPPORT

A brief internet search will show that the number of companies offering herbal remedies for every animal condition is rapidly expanding. The vast majority of these companies, owned by lay entrepreneurs, are supported by no veterinary knowledge at all. The establishment of a veterinary botanical medicine

¹⁷ Murphy LA, Panek CM, Bianco D, Nakamura RK Use of Yunnan Baiyao and epsilon aminocaproic acid in dogs with right atrial masses and pericardial effusion. J Vet Emerg Crit Care (San Antonio). 2016 Sep 26

specialty will serve to highlight the role of veterinarians in the medical treatment of animals, whether the medication is OTC or prescription. The establishment of this specialty will address the growing interest, demand and use of alternatives and adjuncts to conventional drugs in production animals, equines and small animals coupled with the recognition that herbal medicine offers a substantial scope of pharmacological actions and benefits in addition to conventional medicine for challenging medical issues. The herbal medicine diplomate must have an expanded understanding in the areas including, but not limited, to principles of herbal medicine (whether ethnomedical or scientific principles are being used in decision-making); the herbs (pharmacology, the correct portion of the plant that has medicinal properties, preparation, manufacture, indications, palatability, application, compatibilities with other herbs, herb drug interactions, contraindications, dosing), therapeutic strategies, nutrition, pharmacology and this is in addition to basic knowledge of traditional medical and surgical veterinary problems.

In a survey conducted in 2016 by the ACVBM organising committee to approximately 800 members of AHVMA and 240 members of VBMA, 103 veterinarians responded (9.9%).

- 86% had been referred a clinical case from a veterinarian in the past 12 months.
- 72% of respondents had been referred between 10 and more than 50 cases over the past 12 months.
- 45% of respondents had been referred between 1 and more than 50 clinical cases from a board certified specialist in various fields for herbal medicine treatment in the past 12 months.
- 96% of veterinary herbalists had provided advice to a veterinarian on the use of herbs in the past 12 months.
- 40% had consulted to between 10 and 50 veterinarians over the past 12 months.
- 70% of the advice to other veterinarians covered case management, herb choice, herb dose and herb drug interactions.
- 34% of respondents provided a training service or internship for veterinary students.
- 55% of veterinarians had formal training in Western or Chinese herbal medicine.
- 22% of respondents had provided advice/ consulting to industry and pharma on use of herbs, product formulation or safety.

The ACVBM Organising committee has received support for this petition from a selection of academics at veterinary schools; diplomates in private specialist practices, veterinary students, organic dairy industry boards and members of the general public (See Appendix II & III).

ACVBM BYLAWS

The Bylaws (Appendix I) were prepared according to the guidelines in the *ABVS Criteria for Establishment of a Veterinary Specialty Organization*. Specific entities required in the Bylaws include information on the following:

A. Name of the organization is the American College of Veterinary Botanical Medicine (ACVBM). The ACVBM has been incorporated under the laws of the State of Delaware as a not-for-profit, tax-exempt organization for the purposes set forth herein, and in the Certificate of Incorporation. The corporation has no members.

B. The statement of objectives is included in the *Policies and Procedures* document.

C. Election procedures, titles, and duties are detailed in the Bylaws.

D. Membership categories, including duties, privileges and methods of selection for each category, are detailed in the Bylaws. A list of current officers of the ACVBM and their curriculum vitae are attached (Appendix IV & V). Charter diplomates will be selected at a later date based on acknowledged expertise

in veterinary botanical medicine and as recognised educators and practitioners of botanical medicine and contributions to the organization of the specialty.

E. The details on eligibility for candidacy are found in the *Policies and Procedures* document.

F. A description of approved methods for an alternative pathway is found in the *Policies and Procedures* document.

G. Description of the scope and nature of certifying exams:

The veterinary botanical medicine written examination will consist of four (4) parts.

- I. General botanical medicine
- II. Principles and practices
- III. Clinical botanical medicine
- IV. Botanical identification of medicinal plants

Description of the scope and nature of certifying exams will be developed by the Credentials and Education Committee and Administered by the Examination Committee.

H. Procedures for establishing and modification of dues and fees are the responsibility of the Board of Directors and will be determined by a majority vote.

I. Loss of licensure and/or conviction of a felony would be cause for censuring or suspending diplomates or canceling certification. The Board of Directors is responsible for reviewing documentation and selecting the appropriate form of disciplinary action by a vote of two-thirds majority. The diplomate will be notified by mail within fourteen days of the decision of the Board.

J. The procedures for appealing adverse decisions are detailed in Article XI section E of the Bylaws.

K. Governance is described in Article VIII in the Bylaws.

Organization of ACVBM Specialty

The organizing committee has selected the following committee structure and membership to undertake its functions.

Executive Committee

1. Will be composed of Co-chairs and Members

2. Duties: The Executive Committee shall procure funding for the corporation, develop a time line according to ABVS submission guidelines, appoint a secretary/treasurer for the ACVBM, develop a meeting schedule for the Board. The Executive Committee may act for the Board of Directors between meetings of the Board of Directors, or as otherwise authorized by the Board of Directors. The Executive Committee shall not, however, have the power to: remove a Regent or Officer; fill vacancies in the Board of Directors or in any committee; determine and fix compensation for any individuals for serving on the Board of Directors or any committee; sell corporate assets; amend, repeal, or adopt Bylaws; or, amend or repeal any resolution of the Board of Directors.

Nominating/Membership Committee

1. Will be composed of Co-chairs and Members

2. Duties: The Nominating Committee shall oversee and supervise the nominating process for members of the Board of Directors, and shall establish appropriate procedures and rules for the selection and presentation of qualified candidates to active ACVBM diplomates for election. Among other duties, the Nominating Committee shall: establish qualifications for charter diplomate status, nominate charter diplomats, perform surveys to identify potential members of the ACVBM; raise awareness of the establishment of ACVBM among potential members; review and study the credentials of candidates; and develop a slate of qualified candidates. Under the direction of the Board of Directors, the Nominating Committee shall perform its duties and annually report its findings to the Board of Directors.

Credentials Committee

1. Will be composed of Co-chairs and Members

2. Duties: The Credentials Committee, shall be responsible for: establishing the candidate credential eligibility criteria in accordance with these By Laws; reviewing ACVBM certification applications; approving applicants who meet the certification eligibility criteria; identifying to the Board of Directors those applicants who are deemed eligible and ineligible for examination; establish criteria for residencies in veterinary botanical medicine and oversee the establishment and development of new residency programs in veterinary botanical medicine and inform candidates of committee decisions.

Examination Committee

1. Will be composed of Co-chairs and Members

2. Duties: The Examination Committee shall: define the examinations for diplomate status in both subject matter and distribution of questions and type of exam (is multiple choice, short answer, practical etc); will write the knowledge tests; administer, monitor and grade the Diplomate Certification Examination. It shall make recommendations to the Board regarding competence of those candidates who have completed the Diplomate Certification Examination.

3. The Examination Committee has determined that examination questions will be submitted by all members of the organizing committee in multiple-choice format and written under the guidelines of the National Board of Medical Examiners (NBME).

4. The examination will cover core knowledge of botanical medicine, botanical identification and principles and practices of botanical medicine, as well as a concentration in the area of clinical application across species (Appendix VI). Components of the examination will test Western or Chinese botanical medicine. The examinations will be paper or computer-based and will be administered at a site and on a date determined by the ACVBM Board of Directors. The examinations will be administered and monitored by the Curriculum/Education/Examination Committee. Test questions will be marked and evaluated by the Curriculum/Education/Examination Committee.

5. Training programs are available (Appendix VII). It is estimated that 250 veterinarians each year for the last ten years have undertaken botanical medicine training. The objectives of these programs are to prepare veterinarians to provide botanical medicine services. In addition many veterinary conferences provide basic to advanced training in botanical medicine. The success of these programs will be evident

by growth in the number registrants. At the present time, existing educational programs are well attended and attendance is increasing.

6. A list of current officers of the ACVBM is attached (Appendix IV). Charter diplomates will be selected at a later date based on contributions to the organization of the specialty.

7. At the present time funding is based on an initial donation, membership dues and conference dues. Future funding will be based on application fees, examination fees, conference fees and membership dues.

Appeals Committee

1. Will be composed of Co-chairs and Members

2. Duties: The Appeals Committee shall consider whether correct administrative procedures have been followed in the decisions made by the Credentials Committee and Examination Committee. The Chair of this committee will call a meeting to review an appeal and notify the Chair of the Board and the Executive Director of the results of that review within thirty (30) days of notification of the appeal. The decision of the Appeals Committee shall be final and there shall be no appeals thereafter.

Training Program Evaluation Committee

1. Will be composed of Co-chairs and Members

2. The Training Program Evaluation Committee shall be responsible for establishment of minimum criteria for Standard and Alternate Training Programs and review of Standard and Alternative Training Program applications and recommendations to the Board regarding acceptability of programs. The committee will define the knowledge base for the college and assist candidates in accessing this information; develop list of organizations and associations that have an interest in and/or provide educational opportunities in the areas of veterinary botanical medicine; develop and inform diplomats of continuing education opportunities relevant to veterinary botanical medicine; develop a list of publications and encourage new initiatives that will provide advanced training in veterinary botanical medicine.

American College of Veterinary Botanical Medicine Policies and Procedures

Establishment of an organizing committee

Eligibility criteria for members of the organizing committee were chosen as having acknowledged expertise in veterinary botanical medicine and as recognised educators and practitioners of botanical medicine. According to the bylaws of the AVMA, committee members had to fulfill at least one of the following criteria:

- Be a professor of this specialty in a college or department of veterinary medicine
- Be an author of important publications resulting from research or practice in this specialty
- Have at least 10 years experience in this specialty and, by teaching, research, or practice, have contributed substantially to the development of the specialty
- Have advanced training in the specialty and have demonstrated competency through teaching, research, or practice in the specialty to which more than fifty (50%) or more of the individual's professional time is devoted

Potential committee members were identified by nomination, which generated the names of 22 candidates. Candidates were discussed and contacted. The consensus was that 16 individuals would be

sufficient to provide a diverse range of expertise in small and large animal, Western and Chinese botanical medicine. It was also determined that the organizing committee should include both practicing and academic veterinarians and diplomates who practice botanical medicine from diverse geographical areas.

Upon establishment of the specialty, charter diplomate status will be conferred upon some, but not necessarily all of the members of the organizing committee. The determination will be based on contributions of individuals to the organizing process.

Members of the organizing committee

The following 16 veterinarians were nominated to the organizing committee (full details and curriculum vitae for each member are included in Appendix IV & V):

Specialty Organising Committee Members

Signe Beebe

Ihor Basko

Shauna Cantwell

Cynthia Lankenau

Rob Silver

Steve Marsden

Hubert Karreman

Constance DiNatale

Barbara Fougere

Susan Wynn

Joyce Harman

Huisheng Xie

Nancy Scanlan

Richard Palmquist

Donna Raditic

Carmen Colitz

Criteria for recognition of ACVBM

1. Improvement in veterinary services provided to the public

Veterinary Botanical Medicine is concerned with the diagnosis, treatment and health maintenance, or health improvement of animals using specialized knowledge of botanical medicines and principles. Botanical medicines include plant preparations (dried, powdered, tinctures, glycefracts, vinegars, wines, pills, salves, oils, teas, granules) and extracts such as essential oils, or constituents like silybum from *Silybum marianum* as well as combinations or formulas. These are applied to conditions and health maintenance across the production animal industry and companion animals for a number of reasons including:

- alternatives to growth promoters and antibiotics and anthelmintics in the face of resistance issues;
- growing consumer demand for organic produce;
- human health and environmental concerns about chemical and drug use and residues in livestock, in aquaculture and poultry and on companion animals;
- treatment options for animals that are refractory to conventional care, suffering drug related side effects or where conventional options have a low evidence base or safety concerns;
- the rising demand by companion animal owners and some organic producers for botanical medicines as a preferred method of treatment.
- the need for palliative treatments in the growing field of animal palliative care and hospice

Expertise in veterinary botanical medicine meets a growing consumer demand from animal owners and producers. It has a substantial evidence base compared to some other integrative and complementary therapies as well as some veterinary specialties admitted to the ABVS. The benefits of botanical medicines for improving animal health and providing evidence of these reasons are emphasised under the following section.

Companion Animals

Trends identified in the ACVBM White Paper 2016¹⁸, from data supplied by the National Animal Supplement Council (NASC) show an enormous growth in the popularity of herbs used on the treatment of companion animals:

- **Canine Data:** Total administrations of the top 25 herbal ingredients for dogs was 42,087,369 in 1999, the first year of tabulating this data. The number of administrations grew over the 17 years recorded to 244,797,878 administrations, estimated for the year 2015. This represents 500% growth.
- **Equine Data:** Total administrations of the top 25 herbal ingredients for horses was 8,385,566 for 1999, the first year of recording this data. This value increased in 17 years of data recording to 42,476,440 administrations estimated by the end of 2015. This is also a 500%

¹⁸ Silber R, Bookout B, Karreman H Documentation of Trends in the Public Acceptance of Botanical Therapies: Consumer Buying Patterns, Patterns of Use and Industry Correlates 2016 January Organizing Committee Report- See Appendix X

growth in number of administrations.

- **Feline Data:** Total administrations of the top 25 herbal ingredients for 1999 for cats was 5,638,172 and was expected to increase to 81,495,270 by the end of 2015. Although cats are experiencing a down turn in number of visits to their veterinarians, the number of administrations of the top 25 herbal ingredients increased 14.5 times during this 17 year period being monitored.
- **Combined Data:** Total administrations of the top 25 herbal ingredients for Dogs, Cats and Horses combined for 1999 was 56,111,107. This value increased over 17 years to an estimated 368,769,588 by the end of 2015. This is a 650% increase in the administrations of these top 25 herbal ingredients, which implies a similar increase in use of these herbal supplements in all species measured.

This 2016 white paper suggests that with the growth of interest in herbal medicine among veterinarians and consumers, most animal supplement companies are in need of scientifically-derived information regarding the safety, herb-drug interactions, and clinical applications regarding herbal therapies in veterinary species, which could be facilitated by the establishment of the ACVBM.

Bovine Practice and Organic Production

The growth in interest of bovine (AABP) practitioners toward complementary and alternative medicine was investigated between 2006 and 2010 using surveys¹⁹. Approximately 80% of the veterinarians were interested in evidence-based alternative therapies, and in particular for the treatment of mastitis. From 2006 to 2010 interest increased significantly ($p < 0.01$) in alternative treatment approaches for calf diarrhea, metritis, infertility, pneumonia and digital dermatitis/foot rot. In general veterinarians with organic clients were more interested in these alternative non-drug therapies than those veterinarians without organic clients. They were particularly interested in treatments with a rational pharmacological basis.

The majority of evidence-based complementary and alternative therapies are based on botanical remedies. This survey of the growth of bovine veterinarians' interest in CAVM between 2006 and 2010 supports the need for the establishment of a College of Veterinary Botanical Medicine as a resource for these veterinarians to better establish the science that underlies these therapies. For industry, the graduation of Board-certified veterinarians with scientific and clinical expertise in botanical medicine and phytopharmacology will be invaluable as companies develop and bring evidence-based botanical products to the marketplace to address the needs of these bovine practitioners and their clients.

Letters (Appendix III) from the Midwest Organic Dairy Producers Association and the Northeast Organic Dairy Producers Alliance (representing 836 organic dairy producers in the Eastern US) express their enthusiastic support for the creation of the ACVBM. They also express that many of their producers are not served by veterinarians with interest or skills in botanical/ holistic medicine. They state that the ACVBM could provide information and experience to support regular veterinarians.

Trends in Consumer Use of Herbal Therapies for Pets

The American Pet Products Association National Pet Owners Survey 2015- 2016

The APPA survey was mined for data regarding the trends in the use of herbal supplements by pet owners of dogs, cats and horses.

¹⁹ Sorge US, Bastan A, Karreman H Interest of Bovine Practitioner in Complementary and Alternative Veterinary medicine in 2006 and 2010) College of Veterinary Medicine, Dept. Veterinary Population Medicine, University of Minnesota, Saint Paul, MN 55108 Advance Research in Agriculture and Veterinary Science vol2(1&2)2015

- **The percentage of dogs and cats given medications** of any kind increased to 77% over the past 12 months. 10 years ago this was 52%, indicating a trend toward better acceptance of administration of medications, and better palatability strategies. More than 90% of horses have been administered medication or supplements this past year.
- **The percentage of pets receiving dietary supplements** excluding vitamins was 12% for dogs (9.3 million dogs), 6% for cats (5.15 million cats), and 5% for horses (375,000 horses).

Consumers source their dietary supplements from the following outlets: (*Multiple response question, therefore total may exceed 100%*)

1. **Dogs:** from Veterinarian (28%), Internet (22%), Pet chain superstore (16%), Pet store independent (13%), Discount/Mass marketing (16%) Hardware store (6%), Other (6%)
2. **Cats:** from Veterinarian (17%); Pet chain super store (25%); Internet (17%); Grocery store (17%); Discount Mass marketing (25%)
3. **Horses:** from Internet (33%); Veterinarian (25%); Feed store (17%) Tack shop (8%) Other (17%)

Consumers source their information about dietary supplements from the following outlets: (*Multiple response question, therefore total may exceed 100%*)

1. **Dogs:** from Veterinarian (65%), Internet (44%), Friends & Relatives (28%); past experience (32%); Pet store personnel (16%), Television (12%); Groomer (15%)
2. **Cats:** from Veterinarian (47%); Internet (42%); Friends & Relatives (33%); past experience (35%); Pet store personnel (13%); Television (10%); Other (8%)
3. **Horses:** from Veterinarian (73%); Internet (48%); past experience (60%); Breed club and societies (17%); Feed store personnel (25%), Farrier/Trainer (50%) Other

Analysis of Survey Data

- Veterinarians are the major source of supply to pet owners for herbal supplements
- Veterinarians are the major source of information about using herbal supplements to pet owners
- The market share that herbal supplements have, in comparison to more commonly used products like food, bedding, tack, collars is relatively small (average 11% for dogs, cats and horses).

The data from the above white paper concludes that the market share for herbal remedies and other alternative therapies has been growing sufficiently over the years since 1990 that this survey has been conducted, such that the APPA has now created a specific category in this survey to measure the trends in this growing segment.

Since 1990 there has been a steady growth in consumer demand for dietary supplements that contain herbal ingredients. Most consumers consult with their veterinarian regarding supplements, and most consumers purchase their dietary supplements from their veterinarian.

Thus, veterinarians are in a unique position of providing evidence based information to their clients about products they believe, based on the best information available, will augment their existing clinical protocols.

It is known that herbs can interact adversely with pharmaceutical therapies, and that not all herbs are

safe or effective. Currently we lack an adequate body of evidence-based information, or Board certified veterinarians, to guide the use of herbal therapies concurrent with conventional therapies. In some cases, herbal therapies can serve as complete substitutes, where appropriate, for conventional therapies. Without these safeguards and without a College of Veterinary Botanical Medicine to accredit board-certified specialists in herbal therapies, the consumer is left without adequate protections that would provide safe and effective options for the use of the botanical therapies that they are requesting and are currently using anyway.

The consumer, the marketplace and the Veterinary profession are ready for the establishment of the ACVBM for all of the reasons stated above. A specialty board would gather the diverse sources of information into a cohesive package; establish post-graduate training, fellowship and research opportunities; and determine criteria for, and administration of the process for certification. The overall goal of the specialty is to encourage and facilitate advanced training of veterinarians in botanical medicine to support the veterinary profession, industry (including aquaculture, dairy, swine, poultry, companion animals, equine and other production species) consumers and industry bodies such as NASC.

2. Necessary number of potential diplomates

The uniqueness of this new specialty is that it is using treatments outside of the established pharmacological research model, yet still having a strong rational basis in pharmacology. The field is rapidly growing and interest among veterinarians and students is high. For example, current membership of the Veterinary Botanical Medicine Association has doubled in less than 5 years to 260 members. More than 3000 veterinarians are trained in Chinese or Western Botanical Medicine by IVAS, Chi or VBMA. The fact that the Delphi process identified 44 veterinarians who fulfilled the AVMA criteria for membership of the organizing committee is evidence that a pool of qualified potential diplomates already exists.

3. The specialty of veterinary botanical medicine and its base of scientific knowledge and practice

There is a very large base of scientific knowledge to support this specialty including proceedings of several RVSO meetings and symposiums, textbooks, journals and journal articles.

A further indication of the growth of the discipline has been the establishment of :

- Grants have supported research in botanical medicine (for example by <http://www.ahvmf.org> have supported Dr Ronald Koh BVM MS Certified Veterinary Chinese Herbalist Assistant Professor LSU School of Veterinary Science currently involved in a research project: The efficacy of acupuncture and Chinese herbal medicine on survival and quality of life in dogs with multicentric lymphoma receiving CHOP chemotherapy: a randomized controlled trial. - See more at: <http://www.lsu.edu/vetmed/vcs/people/faculty/faculty/koh.php#sthash.hnPgAPMT.dpuf>).
- Scholarships (such as through the University of Tennessee scholarship in Integrative Medicine underway 7/15/2014-12/14/16 which involves substantial herbal medicine training- the student is completing a Graduate Diploma Chinese Veterinary Herbal Medicine) and
- Academic positions that support botanical medicine services, research or teaching in several universities including:
 - Dr Keum Hwa Choi DVM, MS, PhD, CVA, MSOMD, LAc, Diplomate NCCAOM Associate professor Department of Veterinary Clinical Studies University of Minnesota one of her current research areas is herbal medicine for managing cancer cases (<http://www.vetmed.umn.edu/bio/veterinary-clinical-sciences/keum%20hwa-choi>);

- Dr Mushtaq Memon BVSc, MSc, PhD Diplomate, American College of Theriogenologists Trained in Chinese Veterinary Herbal Medicine (<http://vcs.vetmed.wsu.edu/people/faculty/h-o/memon>).
- Dr Justin Shmalberg BA DVM Diplomate, American College of Veterinary Nutrition and American College of Veterinary Sports Medicine and Rehabilitation Clinical Associate Professor and Service Chief Integrative Medicine Department of Small Animal Clinical Sciences College of Veterinary Medicine University of Florida (<http://www.vetmed.ufl.edu/about-the-college/faculty-directory/justin-shmalberg/>)
- Dr Christine Egger DVM MVSc Diplomate of the American College of Veterinary Anesthesia Trained in Veterinary Herbal Medicine Professor College of Veterinary Medicine The University of Tennessee and coauthor of Pain Management in Veterinary Practice which has a section on herbal medicine (<http://www.vet.utk.edu/faculty/egger.php>).
- Dr Dwight Bowman Professor of Parasitology Cornell University College of Veterinary medicine, who published Kato S, Bowman DD, Brown DL. Efficacy of Chenopodium ambrosioides as an anthelmintic for treatment of gastrointestinal nematodes in lambs. J. Herbs, Spices, Med. Plants 7:11-25. 2000
- Dr Dorothy Brown American College of Veterinary Surgeons, Diplomate Professor of Surgery, Department of Clinical Studies University of Pennsylvania School of Veterinary Medicine who investigated Coriolus versicolor in dogs Brown Dorothy Cimino, Reetz Jennifer Single agent polysaccharopeptide delays metastases and improves survival in naturally occurring hemangiosarcoma. Evidence-based complementary and alternative medicine : eCAM 2012: 384301, 2012.
- Dr Reed Holyoak DVM, PhD, DACT Professor of Theriogenology, OK State Univ Department head. Incorporates herbal approaches in the treatment of reproductive issues in horses. Published on the use of Chinese herbs in paraparesis of dogs J Trad Comp med Dec 2015.
- Dr Manuel Roberto Cortinas Assistant Professor Practice University of Nebraska Lincoln School of Veterinary Medicine has a special interest in ethno veterinary and botanical methods of parasite control and organic livestock approaches as a tool to address anthelmintic and insecticide resistance.

Current Research

Among the colleges of veterinary medicine in the U.S., Canada and Mexico, there are 3 projects recruiting or recently completed:

University of Florida: Acupuncture and Herbal Medicine for treatment of side effects during CHOP therapy. <http://research.vetmed.ufl.edu/clinical-trials/small-animal/acupuncture-and-herbal-medicine-for-treatment-of-side-effects-during-chop-therapy/>

University of Pennsylvania: Novel Therapeutic for Dogs with Cataracts. <http://www.vet.upenn.edu/research/clinical-trials/penn-vet-clinical-trials/clinical-trial/novel-therapeutic-for-dogs-with-cataracts>

Washington State University: Clinical Effectiveness of Phycox in Elbow Osteoarthritis in Dogs. <http://vcs.vetmed.wsu.edu/research/clinical-studies/elbow-arthritis>

Presentations involving herbal medicine and plant extracts at RVSOs and Symposiums 2013-2015

ACVIM

Effect of a Supplement (SmartGut® Ultra) on Gastric Ulcer Scores and Gastric Juice pH. F. Andrews; P. Lofton; G. Gammon; P. Camacho; J. Cartmill; F. Garza Jr; M. Keowen; M. Kearney Proceedings of the ACVIM Forum, 2013, Seattle WA.

In Vitro Effects of Yunnan Baiyao (Yb) on Coagulation. K. Loyd; L.A. Cohn; S.A. Smith. Proceedings of the 2014 ACVIM Forum, Nashville TN.

ACVO

Kim SH, Lee ER, Park SW, Park S, Noh H, Seo K. Effect of Cepae extract on corneal haze after applying the modified big bubble technique in dogs. Proceedings of the ACVO, 2014, Fort Worth, TX.

Chen Y, Lin CT. The retinal protective and antioxidative effects by nutritional antioxidant supplements in high intraocular pressure induced retinal ischemia in rats. Proceedings of the ACVO, 2013, Puerto Rico.

Kado F, Guou C, Kawada H, Blessing K. Nutraceutical Optixcare EH ameliorates oxidative stress in rats. Proceedings of the ACVO, 2013, Puerto Rico

Miller EJ, Gemensky-Metzler AJ, Wilkie DA, Colitz CMH. Effects of grape seed extract, lutein, and omega-3 fatty acids on lens epithelial cell behavior in vitro and ex vivo. Proceedings of the ACVO, 2013, Puerto Rico

VCS

Pondugula S, Ferniany G, Ashraf F, Abott K, Flannery P, Smith B, Mansour M, Colemana E, Bird R, Smith Annette. A plant-based dietary fatty acid inhibits the growth of canine and human B-cell lymphoma cells by downregulating the activity of multidrug transporters. Proceedings of the Veterinary Cancer Society, Oct 17-19, 2013, Minneapolis, MN.

Levine C. Effects and synergy of feed ingredients on canine neoplastic cell growth. Proceedings of the Veterinary Cancer Society, 2015, Tysons VA.

ACVB

Pike AL, Horwitz DF. An open label prospective study of the use of L-theanine (anxitane) in storm sensitive client owned dogs. Proceedings of the Veterinary Behavior Symposium, July 25, 2014, Denver, CO.

WINSS

Combalin E, Sanchez C, Lambert C, Serister S, Henrotin YE. Synergistic beneficial effects of curcuma extract, green tea extract and hydrolysed collagen in bovine chondrocytes in monolayer culture. The Waltham International Nutritional Sciences Symposium, October 1-4, 2013, Portland OR.

Clero D, Feugier A, Grandjean D. Interest of a pre-exercise nutritional supplementation on working dogs serum inflammation and oxidative stress markers evolution during a standardized mid-intensity exercise. The Waltham International Nutritional Sciences Symposium, October 1-4, 2013, Portland OR.

Martineau AS, Leray V, Talbot C, Breniaux M, Ouguerramm K, Nguyen P. Effect of simultaneous omega 3 PUFA and curcumin supplementation on insulin sensitivity and plasma lipids in obese dogs. The Waltham International Nutritional Sciences Symposium, October 1-4, 2013, Portland OR.

Veterinary Text Book Titles from the last 10 years in Veterinary Herbal Medicine include:

- 2016 Practical Guide to Traditional Veterinary Chinese Medicine Equine Practice Xie H Chi Institute of Chinese Medicine
- 2014 Practical Guide to Traditional Chinese Veterinary Medicine Dr H Xie Redwing Books
- 2014 Essential Guide to Chinese Herbal Formulas Dr Steve Marsden CIVT
- 2012 Chinese Herbal Formulas for Veterinarians Drs Beebe & Salewski, Chen & Chen Redwing Books
- 2012 Chinese Veterinary Herbal Handbook Xie H, Frank L, Preast V Chi Institute of Chinese Medicine
- 2010 Xie's Chinese Veterinary Herbology Wiley-Blackwell
- 2010 Ethnoveterinary Botanical Medicine: Herbal medicines for Animal Health CRC Press
- 2007 Integrating Complementary Medicine into Veterinary practice Goldstein R Ed
- 2006 Veterinary Herbal Medicine Dr Susan Wynn, Dr B Fougere Elsevier
- 2006 Clinical Handbook of Chinese Veterinary Herbal Medicine Beebe, S., Salewski, M Herbal Medicine Press, 2006
- 2005 Psychoactive Herbs in Veterinary Behaviour Medicine Schwartz S Wiley

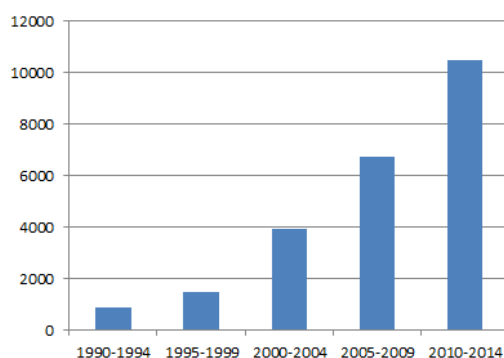
Samples of Text Book Chapter Titles from the last 5 years in Veterinary Herbal Medicine include:

- 2016 Chapter in Principles and Practices of Veterinary Technology Sirois M Chapter 19 pp 494:507
- 2014 Chapter in Veterinary Clinics of North America: Small Animal Practice Lisa Pesch Holistic Pediatric Veterinary Medicine Pages 355-366
- 2014 Chapter in Veterinary Clinics of North America: Small Animal Practice Advances in Veterinary Oncology Evidence Based Integrative Medicine in Clinical Veterinary Oncology pp831-855
- 2014 Chapter in BSAVA manual of canine and feline neurology Treatment of neurological disorders with traditional Chinese veterinary medicine. Chrisman, C. L. Pages: 496-507
- 2014 Chapter in Pain management in veterinary practice. Egger, C. M. ; Love, L. ; Doherty, T. Chapter 15 Traditional Chinese Herbal Medicine and Homeopathy in Pain Management practice Pages: xiii + 447 pp. Wiley Blackwell
- 2014 Chapter in Anthelmintics: Clinical Pharmacology, Uses in Veterinary Medicine and Efficacy Quick W. pp,89-108 ,pp,155-176
- 2013 Chapter in Veterinary Clinics of North America: Small Animal Practice Jeanne B. Budgin, Molly J. Flaherty Alternative Therapies in Veterinary Dermatology Pages 189-204
- 2013 Chapter in Behaviour Problems of the Dog Landsberg G, Hunthausen W, Ackerman L Chapter 9 Complementary and Alternative Therapies for behaviour problems. Saunders Elsevier
- 2011 Chapter in Complementary Medicine for Veterinary Technicians and Nurses Scanlan N Chapter 10 Wiley Blackwell

Journal Publications.

Further, over the last 15 years there has been an increasing publication of research on plant extracts in animals, with more than 10000 studies published from 2010 to 2014 alone.

Table 1. Publications in pub med, plant extracts and animals for each 5 year period since 1990.



Publications since 1990 include over 2000 Systematic Reviews and Meta-analyses using animal models. Recent examples in 2016 include the use animal models and herbal and plant products in:

- Inflammatory bowel disease²⁰
- Asthmatic inflammation²¹
- Ischemic stroke²²
- Neurodegenerative diseases²³

The scientific evidence and publications regarding veterinary herbal medicine is growing. The scientific basis of *in vivo* studies that elucidate mechanisms of action of botanical medicines and their constituents coupled with *in vitro* studies provides a solid scientific basis and supports the claim that this speciality is distinct and identifiable. Included in this petition is a list of 12 selected whole papers (Appendix VIII) demonstrating a broad range of research in the use of botanical plants and extracts in veterinary medicine

²⁰ Triantafyllidis JK, Triantafyllidi A, Vagianos C, Papalois A. Favorable results from the use of herbal and plant products in inflammatory bowel disease: evidence from experimental animal studies. *Ann Gastroenterol.* 2016 Jul-Sep;29(3):268-81.

²¹ Liu F¹, Xuan NX¹, Ying SM¹, Li W¹, Chen ZH¹, Shen HH². Herbal Medicines for Asthmatic Inflammation: From Basic Researches to Clinical Applications. *Mediators Inflamm.* 2016;2016:6943135.

²² Seto SW, Chang D, Jenkins A, Bensoussan A, Kiat H. Angiogenesis in Ischemic Stroke and Angiogenic Effects of Chinese Herbal Medicine. *J Clin Med.* 2016 Jun 6;5(6)

²³ Solanki I, Parihar P, Parihar MS. Neurodegenerative diseases: From available treatments to prospective herbal therapy. *Neurochem Int.* 2016 May;95:100-8.

and published abstracts from USA, European and Australian journals from the last ten years (Appendix IX). These pertain directly to *in vivo* studies and a few selected *in vitro* studies in veterinary medicine (such as a recent one on yunnan baiyao in canine hemangiosarcoma cells²⁴) and we have excluded the many thousands of laboratory animal studies forming a strong scientific case for pocket pets. This sample of published materials demonstrates the broad extent and application of science related to veterinary herbal medicine. Journals publishing articles are outlined for each veterinary medicine area following:

Veterinary botanical medicine and Aquaculture

Journals publishing peer reviewed studies on plant medicine for fish disease and health

- Aquaculture
- J Applied Ichthyology
- Veterinary Parasitology
- Fish and Shellfish Immunology
- Fish Physiology and Biochemistry
- Journal of Fish Diseases
- Veterinary Pharmacology and Therapeutics
- North American Journal of Aquaculture

A recent (2015) review in Veterinary Pharmacology and Therapeutics reports promising effects of many Western and Chinese herbal medicines for treating parasitic diseases caused by protozoa and metazoan, and broad activity against bacteria and fungi. The review lists the main findings and methodologies of the latest research on herbal medicines to stimulate and accelerate research recognizing the current issues regarding indiscriminate use of chemicals and antibiotics in aquaculture²⁵. For example Valladao et al. (2015) were successful in treating severe cases of ichthyophthiriasis in *Piaractus mesopotamicus* fish using two-hour daily baths of the essential oil of *M. alternifolia* for five days, which shows that this has great potential for use in aquaculture²⁶. Likewise a review of the use of immunostimulant herbs in aquaculture as an alternative to drugs, chemicals, growth promoters and antibiotics concludes they can be used as alternatives to these agents primarily because they are easily obtained, inexpensive, act against a broad range of pathogens and are biodegradable²⁷.

Appendix IX-A outlines the abstracts of 14 recent journal articles demonstrating the importance of botanical medicines in aquaculture and supported by a further 35 journal titles published since 2010 from a possible 350 articles published in the last 5 years on plant extracts and fish.

Veterinary botanical medicine and Small Animals

Journals publishing peer reviewed studies on plant medicine for canine and feline medicine

- American Journal Veterinary Research

²⁴ Wirth KA, Kow K, Salute ME, Bacon NJ, Milner RJ. In vitro effects of Yunnan Baiyao on canine hemangiosarcoma cell lines. Vet Comp Oncol. 2014 Jun 29.

²⁵ Valladao G, Gallani S, Pilarski F. Phytotherapy as an alternative for treating fish disease J Vet Pharmacol Therap 38 417-428 2015.

²⁶ Valladao GM, Gallani SU, Ikefuti CV, da Cruz C, Levy-Pereira N, Rodrigues MV, Pilarski F. Essential oils to control ichthyophthiriasis in pacu, *Piaractus mesopotamicus* (Holmberg): special emphasis on treatment with *Melaleuca alternifolia*. J Fish Dis. 2016 Jan 18.

²⁷ Galina J, Yin G, Ardo L, Jeney Z. The use of immunostimulating herbs in fish. An overview of research Fish Physiol Biochem 2009 35:669-676

- Veterinary Dermatology
- The Veterinary Journal
- Journal of Feline Medicine and Surgery
- Applied Animal behaviour Science
- Journal of Veterinary internal Medicine
- Journal Applied Animal Research
- Veterinary Comparative Oncology
- Journal Veterinary Pharmacology and Therapeutics
- Veterinary Clinics of North America Small Animal

Human use of botanical medicines often informs research for veterinary use. Chou et al (2016) reported on the efficacy of cranberry extract for urinary tract conditions in dogs. An *in vivo* and *in vitro* component of the study on 12 dogs with a history of recurrent UTI demonstrated that oral administration of cranberry extract in 6 dogs prevented development of UTI in patients and adherence of E Coli to kidney cells and compared equally to antibiotics over 6 months²⁸. The potential for cranberry in the management of recurrent UTIs is promising in the era of antibiotic resistance.

Some of the challenging clinical cases such as atopic skin disease may benefit from traditional botanical medicine. Marsella et al (2010) reported in *Veterinary Dermatology* on a multicentre trial undertaken with the University of Florida, the Animal Dermatology Clinic (San Diego, CA), Colorado State University and the Veterinary Referral Center of Colorado. It involved the use of a powdered formulation of the fruit *Actinidia argute* (hardy kiwi). This fruit has been traditionally used for health in traditional Asian medicine. In this randomized, placebo controlled trial involving 76 dogs, the preparation was found to be a promising treatment for mild to moderate canine atopic dermatitis when used for 8 weeks. While the molecular mechanism underlying the therapeutic effects remains to be elucidated it was well tolerated and no clinical adverse effects were reported²⁹.

Similarly another proprietary formula consisting of three herbs used in both Chinese and Western botanical medicine, *Rehmannia glutinosa*, *Paeonia lactiflora* and *Glycyrrhiza uralensis* was investigated by Ferguson et al (2006) and reported in *Veterinary Dermatology* for treatment of atopic dermatitis in 120 dogs in a randomized, double-blind, placebo controlled, parallel group design, large-scale study. The efficacy of the combined formula was demonstrated to be at least as good as, and in many cases superior to, that reported for other systemic steroid-sparing agents that are administered to dogs with AD, such as antihistamines, pentoxifylline, arofylline, leukotriene inhibitors and misoprostol. This study was a follow up to a previous study on the same combination that demonstrated reduced erythema and pruritus in canine AD with mild diarrhoea and flatulence observed in a small minority of dogs supporting the safety of the formula³⁰.

Further in 2010, Schmidt et al reported in *Veterinary Dermatology* a double-blind randomized placebo-controlled trial including 22 dogs that demonstrated that the same formula containing *Rehmannia*

²⁸ Chou HI, Chen KS, Wang HC, Lee WM. Effects of cranberry extract on prevention of urinary tract infection in dogs and on adhesion of Escherichia coli to Madin-Darby canine kidney cells. *Am J Vet Res.* 2016 Apr;77(4):421-7.

²⁹ Marsella R, Messinger L, Zabel S, Rosychuck R, Griffin C, Cronin PO, Belofsky G, Lindemann J, Stull D. A randomized, double-blind, placebo-controlled study to evaluate the effect of EFF1001, an *Actinidia arguta* (hardy kiwi) preparation, on CADESI score and pruritus in dogs with mild to moderate atopic dermatitis. *Vet Dermatol.* 2010 Feb;21(1):50-7.

³⁰ Nagle TM, Torres SM, Horne KL et al. A randomized, double-blind, placebo-controlled trial to investigate the efficacy and safety of a Chinese herbal product (P07P) for the treatment of canine atopic dermatitis. *Veterinary Dermatology* 2001; 12: 265–74

glutinosa, *Paeonia lactiflora* and *Glycyrrhiza uralensis* can be an effective glucocorticoid sparing agent in canine atopic dermatitis³¹.

More recently in The Veterinary Journal Blaskovic et al (2014) reported on 48 dogs diagnosed with atopic dermatitis that were included in a randomized, double-blinded, placebo-controlled, multicentre clinical trial. Dogs were treated with a topical formulation containing PUFAs and essential oils including neem oil, rosemary extract, lavender oil, clove oil, tea tree oil, oregano extract, peppermint extract and cedar bark extract or placebo once weekly for 8 weeks. There was significantly more improvement in pruritus scores in the treatment group than in the placebo. No adverse reactions were observed. The study concluded it was safe and beneficial in ameliorating the clinical signs of atopic dermatitis³².

In recognition of some of the limitations of antibiotics and antifungals in small animal conditions, essential oils from plants have also been investigated for their potential use in veterinary medicine, including a randomised controlled trial (Kim et al 2009) in 11 dogs with otitis externa, where essential oils were compared favourably to antibiotics³³; Nardoni et al (2016) reported in the Journal of Feline Medicine and Surgery a comparative open field study involving 14 cats with *Microsporum canis*. The study compared an essential oil based shampoo containing *Thymus serpyllum* (2%), *Origanum vulgare* and *Rosmarinus officinalis* (5% each) and oral itraconazole was as effective as a conventional treatment (oral itraconazole + 2% miconazole/2% chlorhexidine shampoo) concluding that the natural treatment would seem an interesting, natural alternative to conventional topical treatment³⁴.

Likewise essential oils of *Citrus aurantium* 1%, *Lavandula officinalis* 1%, *Origanum vulgare* 0.5%, *Origanum majorana* 0.5%, *Mentha piperita* 0.5% and *Helichrysum italicum* var. *italicum* 0.5%, in sweet almond oil and coconut oil in a commercial product Malacalm was investigated by Nardoni et al (2014) for the treatment of *Malassezia pachydermatis*. The treatment was compared to placebo and to conventional therapy (based on ketoconazole 10 mg/kg/day and chlorhexidine 2% twice a week for 3 weeks) in a randomised controlled trial. At the end of the treatment trial, treatment groups both improved significantly without adverse events. In follow up on day 180 recurrence of clinical signs was observed in all the subjects treated conventionally, but none of those dogs treated with the essential oil formula had recurrence. The study concluded that the formula appeared to be a safe tool for limiting recurrences of this condition³⁵.

Essential oils have also been investigated for their effects on small animal behaviour. In the Journal of the American Veterinary Medical Association, Wells (2006) reported on the use of lavender essential oil to reduce travel induced excitement in dogs associated with travel. 32 dogs were exposed to car travel without lavender oil and compared to travel with lavender oil and their behaviour quantified. Dogs spent significantly more time resting and sitting and less time moving and vocalizing during the experimental

³¹ Schmidt V¹, McEwan N, Volk A, Helps J, Morrell K, Nuttall T. The glucocorticoid sparing efficacy of Phytosol in the management of canine atopic dermatitis. Vet Dermatol. 2010 Feb;21(1):96-105.

³² M. Blaskovic, W. Rosenkrantz, A. Neuber, C. Sauter-Louis, R.S. Mueller, The effect of a spot-on formulation containing polyunsaturated fatty acids and essential oils on dogs with atopic dermatitis The Veterinary Journal 199 (2014) 39–43

³³ Sang-Hun Kim¹, Suk Kim², Hyung-Kyou Jun¹, Duck-Hwan Kim¹,* Efficacy of aromatherapy for the treatment of otitis externa in dogs Korean J Vet Res(2009) 49(1) : 85~89

³⁴ Nardoni S, Costanzo AG, Mugnaini L, Pisseri F, Rocchigiani G, Papini R, Mancianti F. An open-field study comparing an essential oil-based shampoo with miconazole/chlorhexidine for hair coat disinfection in cats with spontaneous microsporiasis. J Feline Med Surg. 2016 Jan 18.

³⁵ S. Nardoni, L. Mugnaini, L. Pistelli, M. Leonardi, V. Sanna, S. Perruccia, F. Pisseri, F. Mancianti Clinical and mycological evaluation of an herbal antifungal formulation in canine *Malassezia* dermatitis Journal de Mycologie Médicale (2014) 24, 234—240

condition³⁶. Graham et al (2005) reported in *Applied Animal Behaviour Science*³⁷ on the influence of essential oil olfactory stimulation (control, lavender, chamomile, rosemary and peppermint) on the behaviour of 55 dogs housed in a rescue shelter. It is suggested that the welfare of sheltered dogs may be enhanced through exposure to appropriate forms of olfactory stimulation. Lavender and chamomile were particularly beneficial, resulting in activities suggestive of relaxation and behaviours that are considered desirable by potential adopters. More recently Ellis and Wells (2010) identified catnip rather than lavender as being a herb that may hold potential as environmental enrichment for captive domestic cats³⁸.

Finding alternatives to chemical parasiticides has led to the development of a number of commercial products using botanicals. A study reported in *Parasitology Research* 2008 (Abdel-Ghaffar et al) discussed the concerns about indiscriminate use of parasiticides that may pollute the environment, but also adversely affects the animal and human health. In this uncontrolled study 10 dogs infested with *S. scabiei* mites were treated with a neem seed shampoo derived from the neem tree (*Azadirachta indica*) which was shown to be effective against sarcoptic mange in dogs. 80% of dogs had hair regrowth and no clinical signs at 2 weeks. The remaining 20% showed only moderate mite counts and improved clinical signs. Furthermore, the topical treatment with neem seed extract shampoo was well tolerated and safe³⁹.

More recently an interest in herbal medicines for integrative cancer care has led to studies including Yunnan Bai Yao (Chinese medicine) as a potential adjunctive therapy for canine hemangiosarcoma through the University of Florida Veterinary School⁴⁰ published in *Veterinary Comparative Oncology* and in 2011 at the University of Pennsylvania Veterinary School with coriolus (a fungal botanical medicine) shown to improve quality of life and outcomes in dogs with hemangiosarcoma⁴¹.

The growing publication of studies in veterinary and allied journals attests to the recognition that botanical medicines offer the potential to improve treatment of many common conditions that affect cats and dogs. There are over 400 journal articles published on plant extracts and canine and feline research. Studies in animals have led to improvements in the treatment of human diseases as well. It should also be acknowledged that dogs are often used as models for studying the effects of botanical medicines of humans. For example *H. hirsute* has been demonstrated to have cholesterol lowering effects in dogs (van Dooren et al 2015)⁴². *Calendula officinalis* has been used to treat acetic acid induced ulcerative colitis in German Shepherds as a model for the human disease. 10 dogs were randomly allocated to receive a placebo of saline or calendula via enema, and calendula was effective in resolving the ulceration⁴³.

³⁶ Wells DL. Aromatherapy for travel-induced excitement in dogs. *J Am Vet Med Assoc.* 2006 Sep 15;229(6):964-7.

³⁷ Graham L, Wells D, Hepper P The influence of olfactory stimulation on the behaviour of dogs housed in a rescue shelter *Applied Animal Behaviour Science* 91 (2005) 143–153

³⁸ Ellis S, Wells D The influence of olfactory stimulation on the behaviour of cats housed in a rescue shelter *Applied Animal Behaviour Science* 123 (2010) 56–62

³⁹ Abdel-Ghaffar F, Al-Quraishy S, Sobhy H, Semmler M. Neem seed extract shampoo, Wash Away Louse, an effective plant agent against *Sarcoptes scabiei* mites infesting dogs in Egypt. *Parasitol Res.* 2008 Dec;104(1):145-8

⁴⁰ Wirth KA, Kow K, Salute ME, Bacon NJ, Milner RJ. In vitro effects of Yunnan Baiyao on canine hemangiosarcoma cell lines. *Vet Comp Oncol.* 2014 Jun 29.

⁴¹ Brown DC, Reetz J. Single agent polysaccharopeptide delays metastases and improves survival in naturally occurring hemangiosarcoma. *Evid Based Complement Alternat Med.* Volume 2012, Article ID 384301, 8 pages

⁴² van Dooren I, Faouzi Mel A, Foubert K, Theunis M, Pieters L, Cherrah Y, Apers S. Cholesterol lowering effect in the gall bladder of dogs by a standardized infusion of *Herniaria hirsuta* L. *J Ethnopharmacol.* 2015 Jul 1;169:69-75.

⁴³ Mehrabani D, Ziaei M, Hosseini SV, Ghahramani L, Bananzadeh AM, Ashraf MJ, Amini A, Amini M, Tanideh N The effect of *calendula officinalis* in therapy of acetic Acid induced ulcerative colitis in dog as an animal model. *Iran Red Crescent Med J.* 2011 Dec;13(12):884-90.

Appendix IX-B outlines the abstracts of 25 recent journal articles demonstrating the broad range of studies of botanical medicines in canine and feline medicine and supported by a further 30 journal titles published in the last 10 years on plant extracts and canine or feline.

Veterinary Botanical Medicine and Cattle including Dairy

Journals publishing peer reviewed studies on plant medicine for cattle medicine

- BMS Veterinary Research
- Research in Veterinary Science
- Journal Dairy Science
- American Journal of Animal and Veterinary Science
- Canadian Veterinary Journal
- Veterinary immunology and Immunopathology
- Animal Feed Science and Technology
- Animal Reproduction Science
- Veterinary Parasitology
- Journal Veterinary Internal Medicine
- Theriogenology
- Livestock Science
- Journal of Parasitic Diseases
- International Journal of Environmental Research and Public Health

Non antibiotic treatments are needed in organic dairy herds⁴⁴ which has prompted a plethora of studies on botanical medicines and plant compounds such as essential oils⁴⁵ and proprietary botanical formulas⁴⁶ for the treatment of mastitis. More broadly though, the use of antibiotics is being increasingly discouraged in the dairy industry because their presence in dairy milk may have potential downstream effects on population health and the agri-food chain⁴⁷.

Analysis of the published literature including the Journal of Dairy Science and a review in Natural Products Communication Journal(Mullen etal 2014; Taga etal 2012) shows that many botanical medicines including essential oils have significant antibacterial, antifungal and anti-inflammatory effects. A recent study through the Texan A & M & Florida Schools of Veterinary medicine and published in the Canadian Veterinary Journal evaluated a combination botanical product containing Western herbs for intramammary treatment of mastitis and demonstrated a faster recovery for the treatment group compared to the control group with median intervals from end of treatment to recovery of 4.6 d and 6.5 d, respectively⁴⁸. A similar study showed a benefit with the Chinese herb *Panax ginseng* via intra mammary administration. Results indicated an immunomodulatory effect and the study concluded the beneficial effect of the extract could be used as alternative therapy in the control of mastitis at drying off, either

⁴⁴ Mullen KA, Lee AR, Lyman RL, Mason SE, Washburn SP, Anderson KL. Short communication: an in vitro assessment of the antibacterial activity of plant-derived oils. J Dairy Sci. 2014 Sep;97(9):5587-91

⁴⁵ Taga I, Lan CQ, Altosaar I. Plant essential oils and mastitis disease: their potential inhibitory effects on pro-inflammatory cytokine production in response to bacteria related inflammation. Nat Prod Commun. 2012 May;7(5):675-82. Review.

⁴⁶ Pinedo P, Karreman H, Bothe H, Velez J, Risco C Efficacy of a botanical preparation for the intramammary treatment of clinical mastitis on an organic dairy farm. Can Vet J. 2013 May;54(5):479-84.

⁴⁷ Taga I, Lan CQ, Altosaar I Plant essential oils and mastitis disease: their potential inhibitory effects on pro-inflammatory cytokine production in response to bacteria related inflammation. Nat Prod Commun. 2012 May;7(5):675-82. Review.

⁴⁸ Pinedo P, Karreman H, Bothe H, Velez J, Risco C Efficacy of a botanical preparation for the intramammary treatment of clinical mastitis on an organic dairy farm. Can Vet J. 2013 May;54(5):479-84.

alone or in conjunction with dry cow antibiotic therapy published in *Veterinary immunology and Immunopathology*⁴⁹.

Another area of investigation is the use of botanical medicines as alternatives to anthelmintics. A recent study published in the *Journal of Parasitic Diseases* demonstrated that the anthelmintic efficacy of crude neem (*Azadirachta indica*) leaf powder against strongyle infections in cattle was equivalent to fendendazole when compared to infected untreated controls. It was concluded that crude neem leaf powder has anthelmintic property and it can further be studied to isolate the active component to produce herbal anthelmintics⁵⁰. In the *International Journal of Environmental Research and Public Health* study on the potential of botanical medicines to protect human health investigated the influence of neem (*Azadirachta indica*) materials (leaf, bark, and oil) on the survival of a strain of *E Coli* (Ec0157) in dairy manure : the neem leaf and bark supplements eliminated the pathogen in less than 10 d with a D-value (days for 90% elimination) of 1.3 d. In contrast, nearly 4 log CFU EcO157/g remained after 10 d in neem-free manure control. Control of this pathogen at the source (manure) are critical as produce crops are often grown in proximity to animal raising operations. The study concluded application of inexpensive neem supplements to control pathogens in manure and possibly in produce fields may be an option for controlling the transfer of foodborne pathogens from farm to fork⁵¹.

Appendix IX-C outlines the abstracts of 25 recent journal articles demonstrating the amount of literature on botanical medicines for mastitis in dairy cattle medicine as well as a few studies on metritis and retained placenta. We have included a sample of recent literature, mainly *in vivo* and a few interesting *in vitro* studies from over 400 possible articles published in the last 10 years on plant extracts and cattle.

Veterinary Botanical Medicine and Equids

Journals publishing peer reviewed studies on plant medicine for equine medicine

- Equine Veterinary Journal
- Veterinary Parasitology
- American Journal of Veterinary Research
- Canadian Veterinary Journal
- Compendium Continuing Education
- Veterinary Journal
- Parasitology Research

Despite the 500% growth in herbal administrations to horses over the past 16 years⁵² published research on equids and botanical medicine is still relatively limited. A review by Williams et al 2008 in *Veterinary Journal* pertinent to herbal supplementation in horses discussed several equine studies including one where *Panax ginseng* has been found to exert an inhibitory effect on pro-inflammatory cytokines and cyclooxygenase-2 expression; that equine studies have tested the anti-inflammatory effects of a single dose of ginger, post-exercise; echinacea was reported to have anti-inflammatory and antioxidant

⁴⁹ Baravalle C¹, Dallard BE, Cadoche MC, Pereyra EA, Neder VE, Ortega HH, Calvinho LF. Proinflammatory cytokines and CD14 expression in mammary tissue of cows following intramammary inoculation of *Panax ginseng* at drying off. *Vet Immunol Immunopathol.* 2011 Nov 15;144(1-2):52-60.

⁵⁰ Jamra N, Das G, Singh P, Haque M. Anthelmintic efficacy of crude neem (*Azadirachta indica*) leaf powder against bovine strongylosis. *J Parasit Dis.* 2015 Dec;39(4):786-8.

⁵¹ Ravva SV, Korn A. Effect of Neem (*Azadirachta indica*) on the Survival of *Escherichia coli* O157:H7 in Dairy Manure. *Int J Environ Res Public Health.* 2015 Jul 10;12(7):7794-803.

⁵² Silver R, Bookout B, Karreman H Documentation of Trends in the Public Acceptance of Botanical Therapies: Consumer Buying Patterns, patterns of Use and Industry Correlates Jan 2016

properties; yucca contains steroid-like saponins, which produce anti-inflammatory, antioxidant and anti-spasmodic effects and horses fed garlic at >0.2g/kg per day developed Heinz body anaemia⁵³. Another study suggested that Sea Buckthorn berry may be efficacious in the prevention or worsening of non-glandular gastric ulcers in horses during times of stress⁵⁴. These point to potential benefits in equine health.

The recognition of the potential of botanical medicine to improve equine health care and expand treatment options is further exemplified by investigations into multiple plant agents for challenging conditions such *Prunella vulgaris* for equine infectious anemia virus (EIAV)⁵⁵, and a review by Tinworth et al 2010 in Veterinary Record on the potential for botanical medicines to manage insulin resistance and hyperinsulinaemia in non-obese horses based on human and laboratory animal data⁵⁶.

More recent studies have explored the use of plant medicines for the management of ecto and endo parasites, including the use of essential oils for donkey lice published in the Equine Veterinary Journal in 2016⁵⁷ and plants showing significant anthelmintic activity against strongyle nematodes published in Veterinary Parasitology 2015⁵⁸.

Chinese Herbal Medicine for equine reproductive management and respiratory disease has been discussed in the Compendium for Continuing Education (2011)⁵⁹.

Appendix IX-D outlines the abstracts of 22 recent journal articles demonstrating selected publications on botanical medicine research on equids.

Veterinary Botanical Medicine for Goats and Sheep

Journals publishing peer reviewed studies on plant medicine for caprine and ovine medicine

- Veterinary Parasitology
- Research Veterinary Science
- Parasitology Research
- Tropical Animal Health Production
- Journal Dairy Science
- Animal Science Journal

⁵³Williams CA, Lamprecht ED. Some commonly fed herbs and other functional foods in equine nutrition: a review. Vet J. 2008 Oct;178(1):21-31.

⁵⁴ Reese RE, Andrews FM, Elliott SB, et al. The effect of seabuckthorn berry extract (Seabuck Complete) on prevention and treatment of gastric ulcers in horses. Presented at the Proceedings of the 9th International Equine Colic Research Symposium, Liverpool. June 8–11, 2008.

⁵⁵ Brindley MA, Widrlechner MP, McCoy JA, Murphy P, Hauck C, Rizshsky L, Nikolau B, Maury W Inhibition of lentivirus replication by aqueous extracts of *Prunella vulgaris*. Virol J. 2009 Jan 20;6:8

⁵⁶ Tinworth KD¹, Harris PA, Silience MN, Noble GK. Potential treatments for insulin resistance in the horse: a comparative multi-species review. Vet J. 2010 Dec;186(3):282-91.

⁵⁷ Ellse L, Sands B, Burden FA, Wall R. Essential oils in the management of the donkey louse, *Bovicola ocellatus*. Equine Vet J. 2016 May;48(3):285-9.

⁵⁸ Peachey LE, Pinchbeck GL, Matthews JB, Burden FA, Mulugeta G, Scantlebury CE, Hodgkinson JE. An evidence-based approach to the evaluation of ethnoveterinary medicines against strongyle nematodes of equids. Vet Parasitol. 2015 May 30;210(1-2):40-52.

⁵⁹ Shmalberg J, Xie H. Acupuncture and Chinese herbal medicine for treating orses. Compend Contin Educ Vet. 2011 May;33(5):E1-11.

Terrill et al 2012 highlight the research trends in ovine medicine by stating that anthelmintic resistance is reaching epidemic proportions in small ruminants in the U.S. and that non-chemical control alternatives are critically needed. They describe the generally warm, moist environmental conditions in the southern United States (U.S.) as ideal for survival and growth of the egg and larval stages of *Haemonchus contortus* and other gastrointestinal nematodes (GIN) of sheep and goats. Critically, infection with GIN is the greatest threat to economic small ruminant production in this region. They also highlight the emerging markets for grass-fed and organic livestock⁶⁰.

A global focus on botanical medicine- plant extracts for the management of gastrointestinal parasites is exemplified by a 2014 review by Mbaya et al, show that extracts of various species of medicinal plants have shown significant *in-vivo* and *in-vitro* pharmacological activities against ecto, endo and haemoparasites. They point out that the scientific evaluations of the use of the plants as antiparasitic agents were based on the claims of ethnoveterinary medicine. The pharmacological activities of these plants were associated with the presence of various bioactive compounds such as alkaloids, flavonoids, saponins, glycosides, allicin, harmala, harmaline, harman, tetrahydroharman, ursolic acid, terpenes, tannins, phenolic compounds, embelin and brucine. In the *in-vivo* studies, plant extracts were tested using animal models such as mice, sheep, goats, cattle and dogs⁶¹.

Botanical medicines are also finding potential in reducing lamb mortality and improving ewe performance (Smeti et al 2015)⁶²; improving ewe milk production (Giannenas et al 2011)⁶³ possibly through activity on the rumen microbiota in work conducted with the Department of Animal Sciences, The Ohio State University (Cobellis et al 2016)⁶⁴; providing alternatives to blow fly control (Callander et al 2012)⁶⁵ and lice treatment (James et al 2012)⁶⁶ and ovine dermatophytosis (Mugnaini et al 2013)⁶⁷.

Appendix IX-E outlines a sample of 8 abstracts and 34 references of 446 journal articles published on the anthelmintic activity of plant extracts in sheep and goats

Veterinary Botanical Medicine for Poultry

Journals publishing peer reviewed studies on plant medicine for poultry.

- Poultry Science

⁶⁰ Terrill TH, Miller JE, Burke JM, Mosjidis JA, Kaplan RM. Experiences with integrated concepts for the control of *Haemonchus contortus* in sheep and goats in the United States. *Vet Parasitol.* 2012 May 4;186(1-2):28-37.

⁶¹ Mbaya AW, Ogwiji M. *In-vivo* and *In-vitro* activities of medicinal plants on ecto, endo and haemoparasitic infections: a review. *Curr Clin Pharmacol.* 2014;9(3):271-82. Review.

⁶² Smeti S, Joy M, Hajji H, Alabart JL, Muñoz F, Mahouachi M, Atti N. Effects of *Rosmarinus officinalis* L. essential oils supplementation on digestion, colostrum production of dairy ewes and lamb mortality and growth. *Anim Sci J.* 2015 Jul;86(7):679-88.

⁶³ Giannenas I, Skoufos J, Giannakopoulos C, Wiemann M, Gortzi O, Lalas S, Kyriazakis I. Effects of essential oils on milk production, milk composition, and rumen microbiota in Chios dairy ewes. *J Dairy Sci.* 2011 Nov;94(11):5569-77.

⁶⁴ Cobellis G, Yu Z, Forte C, Acuti G, Tralbalza-Marinucci M. Dietary supplementation of *Rosmarinus officinalis* L. leaves in sheep affects the abundance of rumen methanogens and other microbial populations. *J Anim Sci Biotechnol.* 2016 Apr 27;7:27.

⁶⁵ Callander JT, James PJ. Insecticidal and repellent effects of tea tree (*Melaleuca alternifolia*) oil against *Lucilia cuprina*. *Vet Parasitol.* 2012 Mar 23;184(2-4):271-8

⁶⁶ James PJ, Callander JT. Dipping and jetting with tea tree (*Melaleuca alternifolia*) oil formulations control lice (*Bovicola ovis*) on sheep. *Vet Parasitol.* 2012 Oct 26;189(2-4):338-43.

⁶⁷ Mugnaini L, Nardoni S, Pistelli L, Leonardi M, Giuliotti L, Benvenuti MN, Pisseri F, Mancianti F. A herbal antifungal formulation of *Thymus serpyllum*, *Origanum vulgare* and *Rosmarinus officinalis* for treating ovine dermatophytosis due to *Trichophyton mentagrophytes*. *Mycoses.* 2013 May;56(3):333-7.

- British Journal Poultry Science
- Research in Veterinary Science
- Parasitology Research
- Parasitology
- Avian Disease
- Canadian Journal of Veterinary Research
- Journal Applied Toxicology
- Journal of the Science of Food and Agriculture
- Animal Science Journal
- Virology Journal
- Annals of Agriculture and Environmental Medicine
- Biological and Pharmaceutical Bulletin
- Pharmaceutical Biology
- Biological Research

A recent review on botanical alternatives to antibiotics for use in organic poultry production highlights the issues of antibiotic resistance (from sub therapeutic use of antibiotics in poultry feed) and consumer concerns of residue contamination and antibiotic resistant bacterial pathogens in the USA (Diaz-Sanchez et al 2015)⁶⁸. Similar concerns have led to a ban on antibiotic use in Europe since 2006 (Varmuzova et al 2015)⁶⁹.

In a 2010 review on dietary plant bioactives in poultry health and productivity the authors state there is increasing evidence indicating that plant medicines can be efficient in controlling poultry diseases and may also influence production parameters such as feed efficiency and product quality and replicate some of the effects of antibiotic growth promoters (Wallace et al 2010)⁷⁰. Chinese herbal medicines have been investigated for their effects on common diseases in poultry for example common formulas are known to be immunomodulating (Li et al 2013)⁷¹ and herbs are a rich source of lead compounds for antiviral treatments including Marek's (Sun et al 2014)⁷². Ginseng has been shown to have activity against Infectious bursal disease (IBD), caused by infectious bursal disease virus (IBDV) of global economic importance in poultry. Oral administration of a ginseng extract enhances both humoral and gut mucosal immune responses to IBD vaccination and offers a better protection against virulent IBDV challenge and therefore might be a promising oral adjuvant for vaccination against infectious diseases in poultry (Zhai

⁶⁸ Diaz-Sanchez S, D'Souza D, Biswas D, Hanning I. Botanical alternatives to antibiotics for use in organic poultry production. *Poult Sci.* 2015 Jun;94(6):1419-30.

⁶⁹ Varmuzova K, Matulova ME, Gerzova L, Cejkova D, Gardan-Salmon D, Panhéleux M, Robert F, Sisak F, Havlickova H, Rychlik I. Curcuma and Scutellaria plant extracts protect chickens against inflammation and Salmonella Enteritidis infection. *Poult Sci.* 2015 Sep;94(9):2049-58.

⁷⁰ Wallace RJ¹, Oleszek W, Franz C, Hahn I, Baser KH, Mathe A, Teichmann K. Dietary plant bioactives for poultry health and productivity. *Br Poult Sci.* 2010 Aug;51(4):461-87

⁷¹ Li XT, Wang B, Li JL, Yang R, Li SC, Zhang M, Huang W, Cao L. Effects of Dangguibuxue Tang, a Chinese herbal medicine, on growth performance and immune responses in broiler chicks. *Biol Res.* 2013;46(2):183-8.

⁷² Sun Y, Niu L, Song M, Zhao X, Sun N, He J, Wu C, Jiang J, Bai Y, Guo J, Li H. Screening compounds of Chinese medicinal herbs anti-Marek's disease virus. *Pharm Biol.* 2014 Jul;52(7):841-7.

etal 2014)⁷³. *Hypericum perforatum* was shown to have a protective effect against unvaccinated chickens infected with IBDV with significant therapeutic efficacy (Shang etal 2012)⁷⁴.

Bozkurt etal 2013 review the use of botanical extracts in the control of coccidial infection in poultry with some plants and their respective volatile oils and extracts having the potential to alleviate coccidiosis and reduce its severity⁷⁵. The use of plant extracts to control poultry helminths is also increasing and herbs like ginger and curcumin have been shown (*in vivo*) to have potential anthelmintic effects against *Ascaridia galli* (Bazh etal 2013)⁷⁶. There is also a growing interest in the use of essential oils to control ectoparasites. In particular the economic impact of the poultry red mite, *Dermanyssus gallinae* as well as the lack of new acaricides and the occurrence of resistance and tighter legislation have driven research in this area (Nechita etal 2015)⁷⁷. Aflatoxins are also a concern in poultry production and plants such as turmeric and Sea Buckthorn have been shown to have a protective effect against toxicity (Gholami-Ahangaran etal 2016, Solcan etal 2013)^{78, 79}.

Appendix IX-F outlines a sample of 40 abstracts of 846 journal articles demonstrating selected publications on botanical medicine research in poultry.

Veterinary Botanical Medicine for Swine

Journals publishing peer reviewed studies on plant medicine for swine.

- Veterinary Parasitology
- Journal Swine Health Production
- Research in Veterinary Science
- Animal Science Journal
- Virology Journal
- Journal of Animal Physiology and Animal Nutrition (Berlin)
- Asian Australis Journal of Animal Science
- Journal of Animal Science Technology
- Archives of Animal Nutrition
- Theriogenology
- Journal of Animal Science
- Animal Science Journal
- Journal Ethnopharmacology
- Reproduction in Domestic Animals

⁷³ Zhai L, Wang Y, Yu J, Hu S. Enhanced immune responses of chickens to oral vaccination against infectious bursal disease by ginseng stem-leaf saponins. *Poult Sci.* 2014 Oct;93(10):2473-81.

⁷⁴ Can J Vet Res. 2012 Jul;76(3):180-5. *Hypericum perforatum* extract therapy for chickens experimentally infected with infectious bursal disease virus and its influence on immunity. Shang R, He C, Chen J, Pu X, Liu Y, Hua L, Wang L, Liang J.

⁷⁵ Bozkurt M¹, Giannenas I, Küçükyılmaz K, Christaki E, Florou-Paneri P. An update on approaches to controlling coccidia in poultry using botanical extracts. *Br Poult Sci.* 2013;54(6):713-27.

⁷⁶ Bazh EK, El-Bahy NM In vitro and in vivo screening of anthelmintic activity of ginger and curcumin on *Ascaridia galli*. *Parasitol Res.* 2013 Nov;112(11):3679-86.

⁷⁷ Nechita IS¹, Poirel MT², Cozma V³, Zenner L²The repellent and persistent toxic effects of essential oils against the poultry red mite, *Dermanyssus gallinae*. *Vet Parasitol.* 2015 Oct 24. S0304-4017(15)30052-2.

⁷⁸ Gholami-Ahangaran M, Rangsz N, Azizi S.Evaluation of turmeric (*Curcuma longa*) effect on biochemical and pathological parameters of liver and kidney in chicken aflatoxicosis. *Pharm Biol.* 2016 May;54(5):780-7.

⁷⁹ Solcan C, Gogu M, Floristean V, Oprisan B, Solcan G. The hepatoprotective effect of sea buckthorn (*Hippophae rhamnoides*) berries on induced aflatoxin B1 poisoning in chickens 1. *Poult Sci.* 2013 Apr;92(4):966-74.

- Animal Reproduction Science
- Immunopharmacology and Immunotoxicology
- Amino Acids
- Clinical and Vaccine Immunology
- Environmental Toxicology and Pharmacology
- Meat Science
- The British Journal of Nutrition

In the past two decades, an intensive amount of research has been focused on the development of alternatives to antibiotics to maintain swine health and performance however there is limited research validating herbs in general for their potential benefits for pigs and the perfect alternative does not exist (Thacker 2013)⁸⁰. None the less plant derived products called botanicals, phyto-genics, and also phytobiotics are used extensively in feed to improve pig performance⁸¹. Aside from having antimicrobial activity, these products potentially provide antioxidative effects, enhance palatability, improve gut function, or promote growth⁸². Two of the most common phyto-genic substances evaluated in swine include the spices oregano and thyme⁸³.

Three plant extracts from capsicum, turmeric and garlic have improved immune responses of pigs and feed efficiency of pigs challenged with porcine reproductive and respiratory syndrome virus (Liu et al 2013)⁸⁴ and reduced diarrhea and inflammation caused by *Escherichia coli* infection, which may be beneficial to pig health (Liu et al 2013)⁸⁵. *Centella asiatica* increases serum haematocrit and white blood cells and mycoplasma immunity to *Mycoplasma hyopneumoniae* in swine (Maneewan et al 2014)⁸⁶. Chinese herbs have been investigated in treating swine disease. In China Chinese patent medicines play an important role in veterinary clinical use. Treatment of swine with Wu Huang Hu can significantly inhibit pneumonia in infectious pleuropneumonia (Wang et al 2015)⁸⁷. *Sophora flavescens* and stevioside combined have a beneficial effect on rotaviral diarrhea in pigs (Alfajaro et al 2014)⁸⁸, *Glycyrrhiza uralensis* extract cures rotaviral enteritis with both antiviral and anti-inflammatory effects in piglets

⁸⁰ Thacker PA¹ Alternatives to antibiotics as growth promoters for use in swine production: a review. J Anim Sci Biotechnol. 2013 Sep 14;4(1):35.

⁸¹ Windisch W, Schedle K, Plitzner C, Kroismayr A. Use of phyto-genic products as feed additives for swine and poultry. J Anim Sci. 2008;86(suppl 14):E140-E148.

⁸² Jacela JY, DeRouchey JM, Tokach MD, et al. Feed additives for swine: Fact sheets – prebiotics and probiotics, and phyto-genics. J Swine Health Prod. 2010;18(3):132–136.

⁸³ Neill CR, Nelssen JL, Tokach MD, Goodband RD, DeRouchey JM, Dritz SS, Groesbeck CN, Brown KR. Effects of oregano oil on growth performance of nursery pigs. J Swine Health Prod. 2006;14:312–316

⁸⁴ Liu Y¹, Che TM, Song M, Lee JJ, Almeida JA, Bravo D, Van Alstine WG, Pettigrew JE Dietary plant extracts improve immune responses and growth efficiency of pigs experimentally infected with porcine reproductive and respiratory syndrome virus. J Anim Sci. 2013 Dec;91(12):5668-79

⁸⁵ Liu Y¹, Song M, Che TM, Almeida JA, Lee JJ, Bravo D, Maddox CW, Pettigrew JE. Dietary plant extracts alleviate diarrhea and alter immune responses of weaned pigs experimentally infected with a pathogenic *Escherichia coli*. J Anim Sci. 2013 Nov;91(11):5294-306

⁸⁶ Maneewan C¹, Mekbungwan A, Charemtantanakul W, Yamauchi K, Yamauchi KEEffects of dietary *Centella asiatica* (L.) Urban on growth performance, nutrient digestibility, blood composition in piglets vaccinated with *Mycoplasma hyopneumoniae*. Anim Sci J. 2014 May;85(5):569-74

⁸⁷ Wang G¹, Kang S¹, Yin Z², et al Therapeutic effect of Chinese patent medicine "Wuhuanghu" on porcine infectious pleuropneumonia and its acute and subchronic toxicity as well as evaluation of safety pharmacology. Environ Toxicol Pharmacol. 2015 Sep;40(2):388-96.

⁸⁸ Alfajaro MM, Rho MC, Kim HJ et al Anti-rotavirus effects by combination therapy of stevioside and *Sophora flavescens* extract. Res Vet Sci. 2014 Jun;96(3):567-75.

(Aljajaro et al 2012)⁸⁹. *Taraxacum mongolicum*, *Viola yedoensis* Makino, *Rhizoma coptidis*, and *Radix isatidis* were evaluated in combination on newborn piglets challenged with virulent porcine epidemic diarrhea virus and the herbs ameliorated the impaired growth performance and lesions compared to controls and the study suggested the mixture could be used as a prophylactic or therapeutic agent (Kim et al 2015)⁹⁰.

In swine reproduction, numerous herbs have been studied for their effects on preserving boar spermatozoa, examples include *Salvia miltiorrhiza* and *Rosmarinus officinalis* which can both protect against peroxidative damage and increase sperm motility and litter size during the process of freezing-thawing (Shen et al 2015)^{91, 92}. Silymarin has been shown to increase prolactin concentrations and protect against oxidative stress in gilts (Farmer et al 2014)⁹³.

Appendix IX-G outlines a sample of 20 abstracts of 599 journal articles demonstrating selected publications on botanical medicine research in swine.

4. Standards for admission to membership

a. The ACVBM will examine only veterinarians who:

- Are a graduate of a college of veterinary medicine accredited by the AVMA; or possess a certificate issued by the Commission for Foreign Veterinary Graduates (ECFVG) or are legally qualified to practice veterinary medicine in some state, province, territory, or possession of the United States, Canada, or other country
- Are licensed to practice veterinary medicine
- Meet the education, training, and experience requirements established by the ACVBM
- Demonstrate unquestionable moral character and ethical professional behavior

b. The ACVBM will certify only those veterinarians who have met established training and/or experience requirements and attained acceptable scores on comprehensive examinations administered by the ACVBM, their fitness and ability to practice the specialty.

⁸⁹ Alfajaro MM, Kim HJ, Park JG et al Anti-rotaviral effects of Glycyrrhiza uralensis extract in piglets with rotavirus diarrhea. Virol J. 2012 Dec 18;9:310.

⁹⁰ Kim HB, Lee CY, Kim SJ, Han JH, Choi KH. Medicinal herb extracts ameliorate impaired growth performance and intestinal lesion of newborn piglets challenged with the virulent porcine epidemic diarrhea virus. J Anim Sci Technol. 2015 Oct 8;57:33

⁹¹ Shen T, Jiang ZL, Liu H, Li QW. Effect of Salvia miltiorrhiza polysaccharides on boar spermatozoa during freezing-thawing. Anim Reprod Sci. 2015 Aug;159:25-30.

⁹² Malo C, Gil L, Cano R, Martínez F, Galé I Antioxidant effect of rosemary (*Rosmarinus officinalis*) on boar epididymal spermatozoa during cryopreservation. Theriogenology. 2011 Jun;75(9):1735-41.

⁹³ Farmer C, Lapointe J, Palin MF. Effects of the plant extract silymarin on prolactin concentrations, mammary gland development, and oxidative stress in gestating gilts. J Anim Sci. 2014 Jul;92(7):2922-30.

5. Requirements for training and experience and prerequisites for examination

The eligibility requirements and experience prerequisites for taking the examination have been based on those of other established RVSOs.

6. Approved routes through education, training, and experience to qualify candidates for examination

Candidates must:

- Be a graduate from a college or school of veterinary medicine accredited by the AVMA; or possess a certificate issued by the Educational Commission for Foreign Veterinary Graduates (ECFVG) or by the PAVE program; or be legally qualified to practice veterinary medicine in some state, province, territory, or possession of the United States, Canada, or other country
- Be licensed to practice veterinary medicine
- Fulfill the requirements for the academic residency training path or alternative residency training path (see below)
- Demonstrate unquestionable moral character and ethical professional behavior

There will be two routes for satisfying the credentials requirements: an standard residency training path and an alternative residency training path.

1. ***STANDARD RESIDENCY TRAINING PATH***: Minimum 2 years residency under guidance of ACVBM board mentor or a PhD in a field related to botanical medicine, ACVBM case log, and one (1) peer reviewed/refereed publication.

2. ***ALTERNATIVE RESIDENCY TRAINING PATH***: Minimum 3 years experience in practice with greater than 50% time devoted to botanical medicine, ACVBM case log, and 1 peer reviewed/refereed publication

Candidates must submit a completed application form from the ACVBM, a copy of their current veterinary license, curriculum vitae, three letters of reference, requested case medical records from the ACVBM case log and one (1) peer-reviewed/refereed publication.

7. Experience requirements relevant to the objectives of the ACVBM specialty

Candidates will not be required to have a waiting period between formal training and eligibility to sit for the examination.

8. Notification of candidates regarding deficiencies in credentials that prevent their examination or certification by the ACVBM

Candidates will be notified of any deficiencies in credentials no later than 120 days prior to the date of the examination.

9. Examination procedures

a. Written examinations will reflect the professional competence and knowledge base expected of a diplomate of the ACVBM.

- b. After approval of credentials, candidate's will have a period of 120 days available for examination preparation prior to taking the certification test.
- c. If a candidate's credentials are denied and an appeal is filed, the ACVBM will review this appeal and inform the candidate of their decision no later than 90 days prior to the examination date.
- d. Candidates will receive an outline of the exam content (blueprint) and exam format prior to the exam.
- e. Candidates will be informed prior to the examination of the passing score, or, if this is not determined in advance, the method of setting the passing score. The passing score may be adjusted lower but not higher after administering the exam. The minimum passing score will be determined the Examination Committee and approved by the Board.
- f. Candidates shall be sent written notification of the results of the examination no later than thirty (30) calendar days after the examination. All candidates shall be given such notification on the same day.
- g. Candidates who do not successfully pass the examination, will, upon request, be provided with an explanation of the deficiencies that prevented their passing the examination. This procedure will be published by the ACVBM organization prior to the examination.
- h. All candidates will be informed of their remaining eligibility and reapplication procedures.
- i. ACVBM will avoid personal conflict, or the appearance of conflict, that could affect results of examinations.
- j. The ACVBM will accommodate reasonable requests from applicants with documented disabilities for special test considerations in accordance with the Americans with Disabilities Act (ADA). Model language for ADA requests is provided in Appendix V.

10. Certificates attesting to diplomate status

Certificates will be issued indicating that the individual is a diplomate of the American College of Veterinary Botanical Medicine. The certificates will not be time limited.

11. Establish a formal appeal procedure for candidates in case of an adverse decision by the ACVBM

An appeals process has been established and is included in the Bylaws in Article XI Section E. A copy of the appeals procedures will be sent with the application form. A person who believes a decision by ACVBM has adversely affected them may appeal the decision by submitting a written petition for reconsideration on the grounds that the ACVBM:

- a. disregarded the established criteria for certification
- b. failed to follow stated procedures according to Bylaws
- c. failed to consider relevant evidence and documentation presented.

The appeal of a credentials or examination determination will be subject to the policies and procedures for appeals adopted by the Board of Directors. An appeal relating to the candidate's credentials must be reviewed by the Board of Directors and the candidate will be informed of the decision 30 days prior to the exam date. An appeal relating to the examination will be evaluated by the Board of Directors and a decision made within 60 days after receipt of the appeal.

12. Provision of special training beyond the professional veterinary degree to enhance the ability of candidates to meet certification requirements and to maintain the competence of diplomates.

Botanical medicine training is available through industry recognised courses and post graduate qualifications in herbal medicine or through attendance at conferences offering in-depth coverage of these areas. The Education Committee will work toward expanding and enriching existing programs, including CE opportunities offered. The establishment of new residencies in botanical medicine will be a priority.

13. Scope of activities

The ACVBM will avoid agreements or contracts that lead to activities outside the scope of the stated objectives.

14. Contents of Constitution, Bylaws and Policies and Procedures Documents

The ACVBM will notify the ABVS of any and all changes to the Bylaws and *Policies and Procedures* documents at the time of the next annual report. Both the previous and newly accepted wording will be presented.

15. Incorporation of ACVBM

The ACVBM has legal incorporation as a not-for-profit educational organization within the state of Delaware with tax exemption under section 501 (C)(3) or 501 (C) (6) of the Internal Revenue Service Code.