

Foreword

It all started a few years ago in a dark corner of the Simon Fraser University Pub. A number of John Borden's former students were enjoying their favourite beverage when the conversation invariably turned to discussing John's latest adventures. We were particularly reflective that day (and it was still early) and all began to trade stories on John's adventures. An underlying current in these stories was that John had been such a tremendous influence on our lives as students. He still is. Then it happened. While not quite an epiphany, it was an extraordinary and poignant moment when almost instantly we came up with the same idea: let's do something very special for John that would not only convey properly the immense influence he has had over our lives and careers as researchers, but also on the profession of entomology in Canada and throughout the world. And so with this auspicious beginning, the tribute to John Borden was born. Soon after floating the idea of a tribute to John it became apparent that all of John's students and colleagues felt likewise—and there were a lot more stories about John Borden than we could imagine.

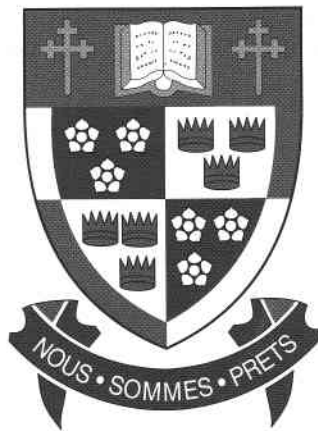
We hope the biographical sketch will at least outline some of the highlights of this illustrious career. It is doubtful, however, that this special issue of *The Canadian Entomologist* could reflect alone our heart felt thank you to John adequately. Thus, to ensure this would not go unnoticed by the scientific community, three other tributes to John Borden were organized: a symposium and dinner which was held at the joint annual meeting of the Entomological Societies of Canada, America, and Quebec in Montréal in 2000, and a memorabilia journal that will contain stories (documented with pictures) that made the career of John Borden such a special one.

For those who know him, it comes as no surprise to hear that John Borden wears many hats, and wears them well, but undoubtedly he is best known for his pioneering and innovative research in chemical ecology. John has had a long-standing interest in the evolution and production of bark beetle pheromones and conifer terpenes and it is therefore fitting that we begin this issue with a review by Steve Seybold, Jorg Bohlmann, and Ken Raffa of the biosynthesis of bark beetle pheromones and conifer isoprenoids. Ambrosia beetles have been the subjects of many studies by John and his students. As a tribute to John, RA Beaver has named a new species of Ambrosia beetle, *Platypus bordeni*. The bark beetle genus, *Dendroctonus*, is one of John's favourite insect groups. Moser and Macías-Sámamo discuss the historical biogeography and tarsoemid mite associates of the southern pine beetle, *Dendroctonus frontalis*, in the southern United States and Mexico. Pheromone identification coupled with laboratory and field bioassays is a common theme in much of John Borden's research. In this issue, McElfresh *et al.* reveal their discovery of the female-produced sex pheromone blend of the pandora moth, *Coloradia pandora pandora*, and the efficacy of the three component blend in capturing males in the field. Similarly, Aldrich *et al.* identify the attractant pheromone and allomone from female *Alydus eurinus*—a broad headed bug. International collaboration of chemists and biologists to disclose the identity of pheromones is a familiar trait of John Borden's work and the next two papers share this approach. Birgersson *et al.* identify the aggregation pheromone for *Pityogenes hopkinsi* and Dallara *et al.* identify semiochemicals from three species of *Pityophthorus* and discuss how these semiochemicals are useful in studying the relationships of these twig insects with a pitch canker disease. Factors that affect the practical application of pheromones are important to their development in pest management. The papers by Lindgren *et al.*, Rappaport *et al.*, and de Groot and DeBarr demonstrate some of the many facets in the development and testing of pheromones for practical use in forestry. John has always stressed to his many students and colleagues the importance of

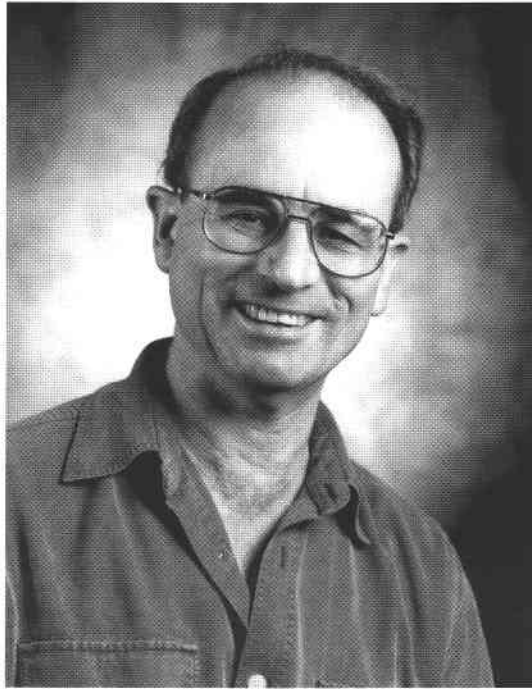
understanding the biology and ecology of an insect as a fundamental requisite to the applied ecology. Ostaff and Quiring examine the factors influencing the population dynamics of the *Zeiraphera canadensis*, in managed and unmanaged stands of *Picea glauca*. Temporal and vertical distribution of insects in trees are the subjects of research by Safranyik *et al.* and Miller. Studies of insect life history are fundamental to pest management, as evidenced by the studies by Ryall and Smith, and Poland *et al.* for *Tomicus piniperda*, and Maclauchlan and Brooks for the *Pissodes terminalis*. The conservation and enhancement of insect parasitoids is critical to an integrated pest management approach and one that has been championed by John Borden. Stephen and Browne show how an application of food may be made to conserve and enhance parasitoids of *Dendroctonus frontalis*. Intraspecific insect communication can be achieved in several ways: the paper by Mistal *et al.* provides the first evidence that sonic signals are part of the communication system for the German cockroach, *Blattella germanica*. The relationship an insect has with its plant host has remained a curiosity and research topic for John Borden. Paine *et al.* examine the attractiveness and suitability of various hosts for the colonization and survival of a cerambycid, *Phoracantha semipunctata*, and Schlyter *et al.* examine the response of two species of *Tomicus* (shoot beetles) to nonhost and bark volatiles. In the final paper, the roles of geography, genetics, and behaviour to the host specificity of *Pissodes strobi* are presented by Philips and Lanier.

We thank the authors from around the world for contributing their papers as a tribute to John Borden. We also thank those authors whose papers unfortunately were not included in this special issue. We extend our sincere appreciation to the Entomological Society of Canada for their generous and willing support for this tribute issue and to Simon Fraser University for their significant financial contribution. Finally, it has been an immense pleasure to work with Dr. Jean Turgeon, Editor of *The Canadian Entomologist*, in the production of this tribute: his support, dedication, and even his green pen were much appreciated.

Peter de Groot
Lorraine Maclauchlan
Guest Co-editors



**SIMON FRASER
UNIVERSITY**



Dr John Borden

Dr John Borden was born in Berkeley, California, in 1938, and then moved with his family as an infant to Vancouver, British Columbia. In 1963, he received his Bachelor of Science in entomology from Washington State University. From 1963 to 1966, John was enrolled as a graduate student in Forest Entomology at the University of California, Berkeley, with Dr David L Wood as his major professor. Dr Wood and John Borden immediately became an enthusiastic team exploring the chemical ecology of destructive bark beetles. In short order, John Borden completed his MSc and PhD degrees and was immediately recruited to a professorship in biology at the newly founded Simon Fraser University in British Columbia. He was promoted to Associate Professor in 1971 and to Professor in 1975. In 1977, he was nominated for, and awarded, the C Gordon Hewitt Award of the Canadian Entomological Society of Canada for superior research accomplishment for scientists less than 40 years of age. Winning this award set the stage for his many future awards that have recognized his contributions to entomology, forestry, and agriculture. Some of these most prestigious awards include the following:

- Fellow of the Entomological Society of Canada (1981)
- JE Bussart Memorial award from the Entomological Society of America (1984)
- Gold Medal in Natural and Applied Science, Science Council of British Columbia (1985)
- Award of Excellence, Professional Pest Management Association of British Columbia (1986)
- Scientific Achievement Award, Canadian Institute of Forestry (1986)
- Gold Medal, Entomological Society of Canada (1988)
- Killam Research Fellowship, Canada Council (1990–1991)
- Fellow of the Entomological Society of America (1999)
- Fellow of the Royal Society of Canada (1999)

Dr John Borden recognized early on the power of assembling multidisciplinary groups to attack problems that encompassed biology, ecology, and chemistry, as exemplified by the insect Chemical Ecology Research Group at Simon Fraser University that he has been Director of since 1981. This group is world renowned for its pioneering contributions in areas as diverse as forest entomology, stored products and crop protection, pheromone identification and biosynthesis, insect–plant interactions, host cues and parasitoid foraging behaviour, and honeybee biology. In addition to his outstanding research record, John has a long and distinguished record of service at all levels, extending from organizing and chairing local committees and societies, to membership and chairing of committees of international organizations. He has frequently advised regional and national governments, and has been a consultant or advisor to international organizations.

Dr Borden's philosophy of transferring his research findings into practical application in solving and preventing insect pest problems gives his accomplishments added value and significance. His research on semiochemicals with the Chemical Ecology Research Group at Simon Fraser University has revolutionized forest insect management. One of his most notable contributions to the British Columbia forest industry is his development of an operational management system for the mountain pine beetle. The strategies and tactics of operational semiochemical baiting for mountain pine beetle management are included in the *Bark Beetle Management Guidebook of the Provincial Forest Practices Code*. The knowledge gained and semiochemical baits developed for other species of injurious forest insects based on research by Dr Borden and colleagues provide the economic base and stability of a high technology company, Phero Tech, Inc. Many of Dr Borden's significant achievements are the result of a highly productive collaboration with chemists. This cooperation led to the identification of behaviour-modifying chemicals for 14 species of scolytid beetles; 2 species of forest defoliators; 7 species of stored grain beetles (establishing macrolide lactones as a new class of insect pheromones); honey bees (queen mandibular pheromone); 5 orchard pests; 3 beetle pests of palms; thrips, seed bugs and lygus bugs (alarm pheromones); and cockroaches ("necromone"). Dr Borden and his many collaborators and students have also helped elucidate mechanisms of pheromone biogenesis, including first experimental demonstrations of the control of pheromone synthesis by juvenile hormone in bark beetles and stored grain beetles, proof of pheromone production by axenically reared bark beetles, demonstration that symbiotic microorganisms produce an antiaggregant pheromone of bark beetles, and discovery that a bark beetle antiaggregation pheromone can be produced by autooxidation of monoterpene precursors, among many other advances in semiochemical research.

During his tenure at Simon Fraser University, Dr Borden has developed and taught numerous undergraduate and graduate courses in biology, entomology, and pest management, and has supervised over 100 masters and PhD theses. He has over 310 refereed journal publications; 54 publications arising from supervised research; 13 invited chapters and conference proceedings; 8 books, bibliographies, glossaries, and reports; 49 nonrefereed papers; and 8 patents.

Most important, however, is Dr Borden's endless energy and enthusiasm for the study of entomology and his role as a mentor to not only his numerous graduate students, but to all field practitioners that have had the pleasure of sharing a day in the woods with him. Dr Borden can just as easily present the findings of his latest research to a scientific audience of hundreds, as to a small group of forestry workers in the bush. This is the truly the mark of a great scientist and individual.