



Department of Entomology
College of Natural and Agricultural Sciences
University of California, Riverside

Presents

The 2024 Alfred M. Boyce Lecture

By

Dr. Maydianne CB Andrade

Department of Biological Sciences
University of Toronto Scarborough

"Control, Context & Choosiness: Flipping the lens to see female plasticity in widow spiders"

In-person and live remote seminar

Location: 1102A Genomics Auditorium

Date: Monday, May. 20, 2024

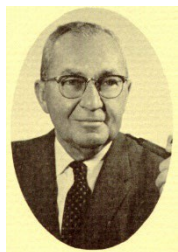
Time: 4:00 pm - 4:50 pm

For remote viewing at the same time and date

Zoom: 983 6120 0167

Passcode: 818719

A reception will follow the seminar at 5:00 p.m.
at the Department of Entomology Courtyard



Alfred M. Boyce
1901-1997

Dr. Alfred M. Boyce began his career in entomology at Cornell University where he earned his B.S. degree in 1926, and M.S. in 1927. In September 1927, he came to the UC Citrus Experiment Station, Riverside, with the appointment of junior entomologist, and he earned his Ph.D from Berkeley in 1931. Dr. Boyce remained on the UC Riverside faculty until his retirement in 1968. He became Professor of Entomology and Entomologist in the Agricultural Experiment Station in 1943. In 1940, he was appointed head, Department of Entomology; in 1952, he became Director of the Citrus Experiment Station, and in 1960, he received the honorary L.L.D. degree (Doctor of Laws Honoris Causa).

During the 1930's and 1940's, Boyce worked on all the insect and mite problems affecting the extensive walnut industry (then over 100,000 acres in southern California), and developed new and/or improved chemical control measures for many species. One of the most exhaustive studies in economic entomology ever made and published by a single entomologist up to that time was his "Bionomics of the Walnut Husk Fly, *Rhagoletis completa*," UC Hilgardia, October 1934. This species was new to science.

Boyce undertook research on insects and mites affecting the citrus industry (then over 300,000 acres) in 1928, which continued until the early 1950's. One of the early successes was the discovery and development of a new dinitrophenol compound for control of several species of mites on citrus and walnuts. This was the first commercially successful organic acaricide for foliar use. Four patents were obtained from this and other research, all dedicated to the public.

Early in his research, he foresaw the need for knowing the fate of chemicals applied to crops - what residues are left and whether they could be harmful to man and other animals. In 1932, he set up a laboratory for residue chemistry, which has since been greatly expanded at UCR.

While Head of the Department of Entomology, Boyce greatly expanded research in many areas, particularly the relatively new areas of insect toxicology, physiology and resistance to insecticides. Because of its eminence in these and other areas of entomology, the UCR Department of Entomology came to be acknowledged as one of the foremost in the world.

Boyce was also greatly interested in biological methods of controlling insect and mite pests. During 1951, he explored many parts of southern Asia, the Middle East, Africa, and Mediterranean countries for beneficial insects that might control scale insects, important pests on many tree fruit crops. He found several new species of parasites and, in conjunction with entomologists at UC Berkeley, two of these were reared and released and have provided a classical example of biological control.

During Boyce's 25 years of active research, he found many new species of insects and mites. Four were named for him when described by specialists. They are *Rhagoletis boycei*, *Parlatoria boycei*, *Cupes boycei*, and *Eriophyes boycei*.

Dr. Boyce was involved in teaching and for many years taught a course in subtropical entomology.

Dr. Boyce's national and international reputation as an entomologist and expert on pesticidal chemicals led to several high appointments: as a consultant to the President's Science Advisor in matters relating to agricultural research; as an advisor to the National Academy of Sciences on pesticides; member of the National Advisory Food and Drug Control, Department of Health, Education and Welfare; consultant to the Foreign Agricultural Service, U.S. Department of Agriculture; and The Rockefeller Foundation's board of agricultural consultants.

Boyce's autobiography was published in 1987, entitled, "Odyssey of an Entomologist - Adventures on the Farm, at Sea, and in the University."

The UC Regents established the Alfred M. Boyce Chair in Entomology at Riverside, an endowed Professorship. The chair is presently held by Dr. Ring Cardé.

Dr. Maydianne CB Andrade

Maydianne CB Andrade is a University Professor the University of Toronto. The goal of her fundamental research is to understand how the reproductive behaviours of males and females arise from the interaction of sexual and natural selection in variable ecological and social contexts, and how this shapes individual phenotypes and species diversity. Work in her research group incorporates integrative studies in the laboratory and field to examine sexual selection, contextual determinants of phenotypic and life history traits that affect reproduction, and how these link to fitness in nature. Using spiders in the genus *Latrodectus* (the widows) and their relatives, she has built on her early research insights regarding the evolution of mate-searching mortality and self-sacrificial mating investment by male redback spiders (*L. hasselti*) as a foundation to examine how the evolutionary ecology of mating is linked to individual development and adult traits (morphology, physiology, behaviour), as well as how these relate to demography. One long term goal is to examine links among mating systems, flexible gene expression (plasticity), invasiveness, and divergence among populations distributed across wide geographical ranges. Professor Andrade is a Fellow of the Animal Behaviour Society, and of the Royal Canadian Geographic Society, and an elected international member of the American Academy of Arts and Sciences. Her research has garnered awards and distinctions throughout her career, most recently the Exemplar Award from the Animal Behaviour Society and from the Society for the Integrative Study of Behaviour, and the Burpee Medal for Science leadership from the Royal Canadian Geographical Society.

Professor Andrade sits on the Scientific Advisory Committee of the Council of Canadian Academies, and is Chair of the National (Canadian) Killam Program selection committee, which adjudicates one of Canada's most prestigious interdisciplinary career awards- the Killam Prize. She is a co-founder and inaugural President of the Canadian Black Scientists Network. Named a 'Community Champion' by the Black North Initiative, this interdisciplinary coalition of professionals and trainees in STEM (Science Technology, Engineering, Mathematics, Medicine and Health) works across sectors and with government to increase Black inclusion in STEM fields, from programs for Black youth through to leadership development. In 2016, Professor Andrade founded the Toronto Initiative for Diversity and Excellence (TIDE), a multi-disciplinary group of faculty volunteers that has delivered data-informed talks, workshops, and practical advice on increasing representation and inclusion in the university to thousands of colleagues. Her work as a sought-after speaker has been extended through a long history of public outreach that includes a podcast on navigating the pandemic lockdown (The New Normal) and creative work as cast, host, and story editor on nature documentaries (The Nature of Things).

Control, Context & Choosiness: Flipping the lens to see female plasticity in widow spiders

Adaptive developmental plasticity (ADP) may evolve when traits that confer reproductive success vary with context, and context is indicated by cues available during development. ADP cues trigger developmental changes, resulting in phenotypes matched to the challenges experienced as adults. My research group has shown that social context (density or proximity of conspecifics) affects the form of sexual selection on male spiders in two species of *Latrodectus* in nature, and that male development shifts in response to demographic cues, conferring higher fitness. For short-lived *Latrodectus* males, this outcome is apparently adaptive. For longer-lived *Latrodectus* females however, it was thought that ADP was likely. However, for females, social context during development may predict optimal levels of adult choosiness (~the likelihood of expressing a mating preference). We studied ADP in female *Latrodectus hesperus* and *L. hasselti* by simulating natural exposure to cues of future mate availability. Females exposed to cues of high mate availability as juveniles showed increased mechanisms of choosiness in their first mating as adults. This included shifts in mating plug placement, premature cannibalism, and copulation frequency, all of which provide female control over post-copulatory sexual selection. Most surprising is the discovery in *L. hesperus* and *L. geometricus* that exposure of final instar females to cues from adult females may trigger more rapid maturation. Plasticity in female mating preferences for male traits is affected by juvenile social experience in other species. This work extends understanding of ADP shaping female choice to encompass choosiness, and suggests intriguing ways in which population density may cause correlated changes in development. I will discuss the complex ways ADP links population characteristics to sexual selection and how *Latrodectus* may serve as a model clade for studies of plasticity.