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Biography

Professor Emeritus Gerald (Jerry) W. Krantz
Recipient of the James Allen McMurtry Award recognising a living acarologist who has made outstanding contributions to acarine systematics or applied acarology or both

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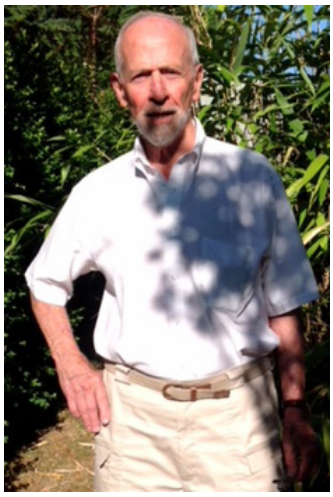

Among the more than 150 acarological works authored or co-authored by Professor Emeritus Gerald W. (Jerry) Krantz that have been published over the last 63 years (1955–2018), certainly the one that has had the largest and most stimulating effect on students, colleagues and scientists in general has been *A Manual of Acarology*, first published in 1970[1]. In the decades after World War II, interest in the Acari was fuelled by the explosion of secondary mite pest outbreaks, the discovery of the importance of biological control in regulating such outbreaks, and ongoing problems in stored products and veterinary and human medicine. As adequate microscopes became more widely available, more and more people began noticing mites everywhere. But what were these strange little arachnids and what were they doing? Other than George Wharton and Ed Baker's *An Introduction to Acarology* (1952), there was little published information available in English to help answer these basic questions until Jerry stepped-up with his spiral-bound first Edition of the *Manual*, perfect for working next to a microscope. The success of the First Edition was immediate and it went through four printings over the next five years. A Second Edition was published in 1978[2] (with a second Printing in 1986), fully bound and had grown from 335 to 509 pages. This was the *Manual* with which I and my cohort of young acarologists were trained. I went through three copies over the years (thanks to the miracle of duct tape: the binding on the Second Edition was its weak spot since the *Manual* was still best used flat open next to a microscope), first learning from and then teaching from

its pages. The Third Edition of *A Manual of Acarology* didn't appear until 2009[3], after ten years of work by ten authors and reaching 807 pages in length.

So how does one come to boldly write a mite manual where none (in English) had been written before? Jerry was born at the very end of the Roaring Twenties near the confluence of the Ohio, Allegheny and Monongahela Rivers in a city, then and now, called Pittsburgh, although in earlier years as the Shawnee, French and British fought each other for control, it had other names. Also known as 'Steel City' and 'The City of Bridges' for its astounding 446 bridges, Pittsburgh also boasts a number of universities and, thanks to parental prodding, Jerry began his studies at the University of Pittsburgh in 1946. There, the famous Professor Ralph Buchsbaum, who with his wife Mildred created *Animals Without Backbones: An Introduction to the Invertebrates* (1938-1987), introduced Jerry to the arthropods and encouraged him to continue his studies with an advanced degree in Entomology at Cornell University. Following a stint in the U.S. Marine Corps, Jerry entered the Entomology Department at Cornell University and, under the guidance of Professor Herb Schwardt, worked on the behaviour and ecology of granary mites. Suddenly, he was an acarologist, and the only one at Cornell University! Two years later, the beautiful and vivacious Vida June Kersch entered his life, beginning a partnership that has lasted for 63 years and counting. In 1955, with a fresh PhD degree, Jerry and Vida (now married) were off to the wilds of the Pacific Northwest.

Corvallis, Oregon, is still a small town in a region where large cities are few and far between. In 1955, the 'Heart of the Valley' (the Willamette Valley) had few paved streets but many free-range chickens – along with what was then Oregon State Agricultural College - to greet the new arrivals. It was at OSU West where Jerry developed his career in acarology, first as Assistant Professor (1955–61), then Associate Professor (1961–66), then full Professor (1966–94) and Entomology Department Chairman (1991–94), and as Professor Emeritus since 1994. Although Jerry continued to work for a time on stored product mites[4-11], he soon expanded his work to include prostigmatan species now placed in the Cryptognathidae, Halacaridae, Pygemphoridae, Dolicocybidae, and Acarophenacidae[12-22], as well as describing new species and behaviours of a variety of agricultural mites such as the rust and big bud eriophyid pests of filbert[23-30] and biological control agents[31-33]. With Jack DeAngelis and other colleagues, Jerry helped unravel how spider mites damage peppermint[34-37], a major crop in the Willamette Valley. Jerry later extended his work to emerging threats to apiculture[38-39]. Among the more significant of his agriculturally relevant papers is the 1979 *Annual Review of Entomology* paper[40] jointly authored with Jerry's co-awardee of the McMurtry Award, Evert Lindquist, on the evolution of phytophagy in mites. Also well worthy of note are his 1973 publication on the very unusual phoretic behaviour of the phytoseiid mite *Kampimodromus aberrans* on filbert aphids[31] and on deuterogyny in the skeleton weed eriophyid mite *Aceria chondrillae*[33].

Although Jerry continued to work on applied acarological projects into the 21st Century, the fascinating new species of mites he found from the coast and rainforests of Oregon began to indicate a shift in focus. Perhaps it was the discovery of *Lobogyniella tragardhi* Krantz, 1958[41], one of the few known acarine associates of termites and one of the northernmost members of the fascinating and largely tropical Trigynaspida, that turned Jerry's attention from stored product pests towards those most interesting of acarines: the Mesostigmata (the subject of much of his published work). In any case, by 1960, he had begun flirting with the group in which he would become the unchallenged world expert, the Macrochelidae. Within two years he had published a review of macrochelid genera[44] and had begun to explore the family at the world level. Although some macrochelids are free-living predators and others occur in more habitat-specific associations, e.g. with bark beetles, bird nests, and social insects, many have developed phoretic relationships with insects that allow them to exploit more ephemeral habitats such as vertebrate dung or carrion, where they are significant predators of other invertebrates.

The years 1962–63 solidified Jerry's knowledge on the Macrochelidae through a sabbatical at the Berlese Collection in Florence, Italy, and he later began a series of visiting professorships and scientific explorations to collect and to study macrochelids and other mite groups around the world. These included two expeditions in 1965 and 1968 into the Mexican State (then Territory) of Quintana Roo, a remote and poorly known part of the Yucatán Peninsula (where Jerry successfully collected a tree viper and a fer-de-lance with a butterfly net and a pair of haemostatic forceps!), a year at the Istituto di Biologia del Mare in Venice studying tidal and subtidal Halacaridae, and an extended assignment as a Senior Research Scientist with CSIRO in Australia and South Africa (with a memorable encounter with a warthog in Kruger Park while investigating rhino dung for beetles and mites) in 1979. The latter assignment was stimulated by the plague of bush and buffalo flies infesting much of Australia at that time, a by-product of the great increase in the cattle trade in the years following World War II. Endemic Australian dung beetles being rather choosy about what dung they eat, a plethora of unburied cow pats covered the paddocks and stations and provided breeding ground for the flies. Jerry explored the potential of introducing certain South African macrochelid mites into cattle-producing sites in Australia to attach phoretically to dung beetles introduced earlier from the same South African localities for cattle dung control. The mites, it was hoped, would put on their white hats and come to the rescue by extirpating the bush and buffalo fly eggs and larvae in beetle-invaded but unburied dung. *Macrocheles peregrinus* Krantz was successfully introduced into Australia at Rockhampton in central Queensland and quickly spread into other cattle-producing areas; but unfortunately, the flies tend to breed faster than the mites can eat them and control has been erratic. Over the past six decades, Jerry has thoroughly documented the diversity of the Macrochelidae in more than three dozen publications[42-80]. His work goes well beyond descriptions and systematic assessments and into the often fascinating behaviours of macrochelid mites. Of special interest are the works that Jerry and his students and colleagues have contributed on the chemical and behavioural mechanisms of phoretic specificity in more highly derived *Macrocheles* lineages[54, 55, 70, 73, 75]. One of the few non-phoretic species of *Macrocheles* that Jerry described is *M. lukoschusi,* which lives in the rectal sac of 2- and 3-toed sloths and feeds there on nematodes[59, 61]. Presumably the ancestors of these mites were phoretic, but *M. lukoschusi* is now a permanent sloth symbiont, vacating the rectal sac and moving into the perirectal fur only during the sloth's weekly descent to the forest floor to defecate.

From the beginnings of his acarological work, Jerry had been as much interested in the behaviour and ecology of mites as in their taxonomy and systematics. One early example is a member of the Dinychidae, *Caminella peraphora*, that he described with Brian Ainscough in 1960[81]. Eighteen years later this publication bore prestigious fruit when Gary Compton and Jerry published[82] on the mating behaviour and morphological specialisations of this mite in *Science*. Jerry has also published in that journal's competitor across the Atlantic, *Nature*, on a very early example of parasitengone mites parasitic on a blood-sucking midge in Cretaceous amber[83] making him perhaps unique among living acarologists in having published research in both of the major English-language general science magazines. Other classic behavioural studies not already mentioned include how *Pneumolaelaps longanalis* Hunter and Husband feed on pollen grains in the nests of bumble bees[84] (and also describing other strange bee associates[85, 86]); plastron respiration in a freshwater oribatid[87] and the intertidal uropodid *Phaulodinychus mitis*[88]; and Jerry's work with the late, great Frank Radovsky on a predaceous deviant, *Mitonyssoides stercoralis*, in the otherwise vertebrate-parasitic family Macronyssidae[89-91]. An especially significant contribution was the discovery by Jerry and his student Jim Wernz[92] that the mesostigmatan tritosternum, in concert with the capitular groove of the gnathosoma, functions as a fluid transport mechanism to move liquid food to the buccal region.

We could go on, especially Jerry's significant reviews, revisions, and new taxa (e.g. [93-96]). Even the Yellow-bellied Marmot was not spared his inquisitive eye[97]. We think, however, that we have

presented sufficient evidence to convince any doubters that Jerry Krantz has been of outstanding service to the discipline of acarology and thoroughly deserves the James Allen McMurtry Award. We would like to end this short encomium with our thanks to our mentor and friend for all of his support over the years, his entertaining stories, the delightful evenings at the Krantz Manse, and his always gentlemanly charm and sage advice.

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