



### DOUGLAS J. WILLIAMS, THE MODERN GURU OF COCCIDOLOGY

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On the occasion of the 70th birthday of Douglas J. Williams, it is our privilege to honor him, as part of ISSIS–VII at Bet Dagan, Israel, for his outstanding achievements in coccidology. We will briefly describe why we feel that this honor is well deserved.

Douglas has an insatiable curiosity about scale insects and seems to be driven to understand and publish on each new discovery. His fascination with scales and need to know more is a powerful force that keeps him focused and excited about this subject. When Douglas says that something will be accomplished, the work will be done, usually sooner than later. He has an encyclopedic memory for the literature, characteristics, and classification of the Coccoidea. His knowledge is so comprehensive that he and his publications serve as an important information resource for many of us.

His contributions to scale insect studies are equivalent to, or exceed those of other important coccidologists including such distinguished scientists as Berlese, Balachowsky, Borchsenius, Ferris, Green, Morrison, etc. Each of these individuals was diverse in his interests, knowledgeable of most families, and published extensively. Douglas fits this profile but adds his own unique characteristics.

Douglas was born in 1924 in Sunderland in northern England and attended school in Newcastle upon Tyne. He became interested in insects in early childhood and collected Lepidoptera and Apoidea. Museum experience was acquired at an early age when most of the material that he collected was identified in the Natural History Museum at Newcastle upon Tyne.

In 1940 Douglas joined a local accountancy firm. He advanced rapidly since most of the staff were called into the armed forces, and at the age of 18 was second in command after the partners. In 1942 he joined the British Royal Navy and studied radar before his duties took him to Australia, New Guinea, Guam, Kwajaleen, Singapore, and Johor. This travel may have stimulated the wide geographical range of his scale insect interests. In the Navy, his interest in the natural world was renewed by taking correspondence courses in agriculture, although delays in the mail system were sometimes frustrating.

In 1946 Douglas was discharged from the Navy and took advantage of Government grants for servicemen to attend the University of Newcastle upon Tyne. He enrolled in agriculture rather than "pure science" because the course contained more entomology. He completed his B.Sc. in 1949 and, with the assistance of a small scholarship, went on for a Ph.D. His research encompassed the Coccoidea of Britain, with special interest in the life history of *Orthezia urticae* which can survive submergence at high tide. While writing his dissertation in 1951 and 1952, he served as a Lecturer at Newcastle upon Tyne.

In 1952 Douglas completed his Ph.D. and was appointed as coccidologist at the Commonwealth Institute of Entomology (now CAB International Institute of Entomology). Wilfrid J. Hall was the Director of CIE and took a keen interest in Douglas. The job was to determine scales and whiteflies sent from all parts of the world, and included little or no research. During the 50s and early 60s, Douglas frequently interacted with Antoni Wladyslaw Jakubski, who studied in the Museum, and Kajetan Boratynski at the University of London.

In 1965 Douglas was hired as a Research Entomologist with the United States Department of Agriculture in Washington, D.C. The job entailed identification of scale insects taken in quarantine at US ports-of-entry, but also determination of material taken in the United States and other parts of the world. He rejoined the staff of the Commonwealth Institute of Entomology in London in 1966.

In 1980 the University of Newcastle upon Tyne awarded Douglas the degree of Doctor of Science. In 1988 he retired from CABI after more than 35 years with the organization. We emphasize that this was not retirement from scale research, Douglas continues to work at a heated pace. He works in the Natural History Museum one day each week, but spends most of his time in his study at home working on any of about ten on-going scale projects.

Up to 1994 Douglas published 115 papers including five books, 12 other comprehensive publications, and over 3,100 published pages. The descriptions include approximately 380 new species and 60 new genera, and redescrptions entail about 750 species. He has co-authored papers with more than 30 different collaborators including individuals from Africa, Argentina, Australia, Britain, Canada, Israel, Mauritius, New Zealand, Norway, Russia, and the United States. He has visited nearly all of the major museums in the world and has spent time in Brazil, France, the Canary Islands, the United States (particularly Florida, Maryland, Virginia, Washington, D.C., and California), South Africa, Nigeria, Kenya, the Gambia, Australia (including Canberra, Adelaide, Sidney, Brisbane, and Melbourne), New Zealand, Canada, Fiji, Italy, Hungary, Poland, Russia, Malaysia, and several others.

Douglas' research includes regional studies, world-wide revisions, nomenclatural issues, distributional information, catalogues, analyses of the scales that occur on a commodity, and checklists. Publications cover every major family within the Coccoidea, but he has a penchant for the Pseudococcidae, is particularly interested in zoogeography, and is fond of theorizing about the unusual distribution of a particular group of scale insects.

The overriding emphasis of Douglas' research program is to enable others to identify scale insects. A concerted effort has been made to clarify and update the work of previous coccidologists so that additions to a fauna or group would truly add to the knowledge of that group, rather than add to the confusion. His early papers on the identities of species described by Maskell, Hall, Newstead, Cockerell, and Green and redescriptions of nearly 400 other species are particularly significant.

Some of his most valuable work has been oriented towards understanding the scales of a particular commodity or from a particular part of the world. His research on the mealybugs of coffee, rice, wheat, and sorghum are especially useful, as are his recent books on the scale insects of the tropical South Pacific and mealybugs of Australia and South America. We sometimes wonder how we managed without them.

Douglas has taken a serious interest in the scale insects that are of agricultural importance. His goal is to anticipate problems and analyze the groups that are most likely to cause future problems. In each of his books, an entire section is devoted to the importance of understanding the systematics of pest scales. He has provided some of the best documentation about how systematists have saved farmers billions of dollars annually. A classic example is *Rastrococcus invadens*, which was highly destructive on fruit trees in West Africa. With his wide experience, Douglas was able to suggest the area of origin of *R. invadens* for a search for natural enemies, enabling location and successful release of a biological control agent. A revision of the genus *Rastrococcus* followed, allowing identification of other potential fruit tree pests. The economic impact of the cassava mealybug, *Phenacoccus manihoti*, which decimated cassava in West Africa, led Douglas to undertake comprehensive research on the mealybugs of South America (the area of origin of the cassava mealybug).

Some useful perspectives emerge from studying Douglas' productivity in ten-year intervals (Table 1). Of course, numbers are only one way of looking at productivity; quality also must be a crucial evaluation factor. However, for the purposes of this analysis we assume that Douglas' research is consistently of a very high quality and will restrict ourselves to numerical values. The following table summarizes some measures of Douglas' productivity over the past 40 years.

TABLE 1  
Productivity of Douglas J. Williams between 1953–1993

Date	Papers/Year	Pages/Year	Species/Year
1953–1962	2.0	30	16
1963–1972	2.3	29	11
1973–1982	2.2	19	6
1983–1992	4.6	230	82
1989–1993	2.4	202	67

For the first 30 years of his career, Douglas made many significant contributions to coccidology. But something unusual happened in the decade between 1983 to 1992; he produced more than twice as many publications, including several books, his page output was at least 7 times more than any previous decade, and he described more than 5 times as many species. In fact, most of this productivity occurred in the five-year period, 1989–1993.

There appear to be three reasons for this surge in productivity. *First*, after retirement Douglas no longer spent time doing large numbers of service identifications, thus freeing up time to do research. *Second*, after 30 years' work, Douglas had become so knowledgeable that his efficiency increased dramatically. It was no longer necessary to spend long periods of time pondering the identity of a species, because he either could recognize most of them or knew where to look in the literature to find a relevant description. *Third*, after the serious problems with mealybugs in West Africa, it became evident to funding agencies that there was a serious need to support basic systematic research on the mealybugs that might pose a similar threat in the future. Thus Douglas finally received some very important assistance. He worked with co-authors Gillian Watson on the scale insects of the tropical Pacific and Cristina Granara de Willink on the mealybugs of South America. After his retirement in 1988, Douglas has remained unusually productive functioning at a level higher than the first 30 years of his career.

The 'frightening' aspect of this story is that if Douglas were not so intensely interested in scales, he would have finished his research when he first became eligible to retire and the scientific community would not have benefitted from the most productive years of his career. As many of you probably know, Douglas is writing another book that will include the mealybugs of southern Asia. Publications in various stages of preparation deal with, *inter alia*, the genus *Micrococcus*, the Furcaspidini, myrmecophilous mealybugs, some *Icerya* of Australia, and others.

Another statistic of equal importance is the many thousands of identifications that Douglas made during his career. Although we do not have accurate figures for the whole time of his employment with CABI, we do know that he identified 1,500–8,000 specimens each year. Often, these names were crucial pieces of information that allowed the client to develop ways to control a pest or to understand the importance of a scale in a particular ecosystem.

Outside of his interest in the Coccoidea, Douglas also has several other talents. He is a true bibliophile and a collector of antique scientific books. He is quite knowledgeable of the silver screen and the actors and actresses that performed on it and usually is more than happy to partake of a good cigar accompanied by some form of quality spirits.

In conclusion, we hope that we have demonstrated that Douglas J. Williams has made many outstanding contributions to coccidology. For a person who was hired in a non-research position, his published achievements are superb; to the clientele who needed to know the names of critical specimens, his determinations were indispensable. For those of us who have received information from his vast reservoir of knowledge, we are eternally grateful. We wish him well in his new endeavors and encourage him to maintain his enthusiasm for learning and teaching about scale insects.