



REVIEW ARTICLE

Fifty years of the *Journal of Apicultural Research*

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Summary

The *Journal of Apicultural Research (JAR)* was first published in 1962 under the Editorship of Dr Eva Crane, Director of the then Bee Research Association (BRA). The journal was envisaged as an international English language medium of refereed science dealing with all kinds of bee including: honey bees, stingless bees, bumble bees and solitary bees. The international nature of this journal and its parent journal *Bee World* were instrumental in the change of title of BRA to International Bee Research Association (IBRA). This paper, coming at the completion of the fiftieth volume of *JAR*, describes the origins and history of the journal, and discusses some of the most notable papers published within its pages.

Cincuenta años del *Journal of Apicultural Research*

Resumen

El *Journal of Apicultural Research (JAR)* se publicó por primera vez en 1962 con el trabajo editorial de la Directora de la entonces llamada Asociación para la Investigación en Abejas, Dra. Eva Crane. Se planificó como una revista científica en lengua inglesa con evaluación internacional, tratando con todos los tipos de abejas, incluyendo a la abeja de la miel, abejas sin aguijón, abejorros y abejas solitarias. Este artículo incluido al final del volumen 50 de *JAR*, describe los orígenes y la historia de la revista, junto con una discusión de artículos notables publicados en estas páginas.

Keywords: *Journal of Apicultural Research*, International Bee Research Association, honey bees, stingless bees, bumble bees, solitary bees

Introduction

The International Bee Research Association (IBRA) has always been forward looking, and has a number of exciting new projects planned for the future, but nonetheless, we cannot ignore the major milestone that our flagship journal, the *Journal of Apicultural Research (JAR)* has now completed fifty volumes of continuous publication with over 1,600 papers published. This article sets down something of the journal's history and highlights some of the most important contributions to bee science recorded in its pages.

History

The origins of *JAR* can be traced back to the birth of the journal *Bee World (BW)* in 1919, founded and published by the Apis Club, which in many ways was a predecessor to IBRA itself (Townley, 1974a). The

history of *BW* is complex, but from its earliest days, amongst the practical articles on beekeeping, details of meetings and transactions of beekeeping associations, acrimonious correspondence and lightweight ephemera, there were serious scientific articles about bees (Showler, 2010). This inclusion of serious scientific articles continued, especially after publication of *BW* was taken over by the newly formed Bee Research Association (BRA) in 1949 under the editorship of its founding Director Dr Eva Crane. Townley (1974b) described: "For some time there had been an increasing feeling that *Bee World*, which included Apicultural Abstracts, was no longer capable of dealing with the amount of material available, nor of satisfying the needs of both practical and advanced beekeepers and scientists, some of whose work was highly specialised. A BRA Members' Meeting was held at the International Congress in Madrid in September 1961; discussions there and afterwards led to replace the monthly journal by a separate quarterly journal *Bee World*... a separate quarterly Apicultural



Fig. 1. Dr Eva Crane (Editor 1962-1981) with Prof. Walter Rothenbuler (Editorial Board Member 1962-1990).

Table 1. JAR Editors / Senior Editors.

Name	Country	Date
Eva E Crane	UK	1962-1981
Reg W Shuel	Canada	1982-1986
Robert S Pickard	UK	1986-1990
Tomas D Rinderer	USA	1991-2002
Keith S Delaplane	USA	2003-2007
Norman L Carreck	UK	2007-present

Abstracts, and a new Journal of Apicultural Research solely for original papers". Callow (1974) added that: "The idea of this was to answer the demands... for a separate publication to which the more erudite scientific papers, containing accounts of original work, could be sent. It was necessary to have a journal devoted wholly to research with a dignified title and appropriate format, if important scientific contributions were to be attracted, the appropriate readers reached, and the cause of publication of research properly served. On at least one occasion in the past, the director of a famous research institute had been incredulous when one of his staff proposed to publish a note in a journal with the unscientific name Bee World. In some other institutes, publication in a 'mixed' journal such as Bee World gave the author less credit towards advancement than publication in a purely research journal".

Establishment of the new journal was aided by grants from the UK Parliamentary Grant-in-aid scheme for Scientific Publications. Volume 1 consisted of a single issue containing just eleven papers and running to 56 pages. It was edited by Dr Crane (Fig. 1; Table 1), with Dr James Simpson of Rothamsted Experimental Station, UK, as Associate Editor (Table 2). The papers were contributed by authors from the UK, the USA, Canada and Poland. It should be noted that at that time, for numerous reasons, both political and cultural, it was difficult for scientists in the developing world and Eastern Europe to

Table 2. Scientific Editorial Advisory Board Members / Associate Editors / Statistical Editors.

Name	Country	Date
G E Bohart	USA	1962-1969
T Gochnauer	Canada	1962-1990
H Kalmus	UK	1962-1969
Martin Lindauer	Germany	1962-1970
Charles D Michener	USA	1962-1990
Otto Morgenthaler	Switzerland	1962-1973
Walter C Rothenbuhler	USA	1962-1990
S F Sakagami	Japan	1962-1990
James Simpson	UK	1962-1963, 1970-1981
J W White	USA	1962-1969, 1975-1990
John B Free	UK	1965-1969
M Delia Seagar		1969-1976
S Cameron Jay	Canada	1970-1990
Warwick Kerr	Brazil	1970-1990
O Mackensen	USA	1970-1977
Reg W Shuel	Canada	1970-1973, 1973-1981
John H Stevenson	UK	1970-1990
N Weaver	USA	1970-1986
Jerzy Woyke	Poland	1970-1990
E P Jeffree	UK	1973-1982
R K Callow	UK	1975-1982
S E McGregor		1977-1981
Wolf Engels	Germany	1978-1990
K Faegri	Norway	1978-1990
E R Jaycox		1979-1981
Eva E Crane	UK	1982-1990
J Beetsma	Netherlands	1983-1990
Jean-Noel Tasei	France	1983-1990
Brenda V Ball	UK	1990
Len A F Heath	UK	1990
S A Kolmes	USA	1990
Ken W Richards	Canada	1990
Ingrid H Williams	UK	1990
Stevan Bucu	USA	1991-1997
David Lowe	UK	1991-1995
Andrew Matheson	UK	1991-1995
Pamela Munn	UK	1991-2005
Ben Oldroyd	Australia	1991-1996
Arnold Saxton	USA	1991-1999
Allen Sylvester	USA	1991-2002
Robert Danka	USA	1992-2007
Peter Jones	UK	1993-2002
Raul Macchiavelli	Puerto Rico	1993-2002
Vicki Lancaster		1998-2002
Brian Marx	USA	1998-2002
Camilla Brodsgaard	Denmark	2003-2004
Adriana Alippi	Argentina	2005-present
Marion Ellis	USA	2006-2007
Fani Hatjina	Greece	2006-present
Richard Jones	UK	2006-2007
Norman L Carreck	UK	2007
Jay Evans	USA	2008-present

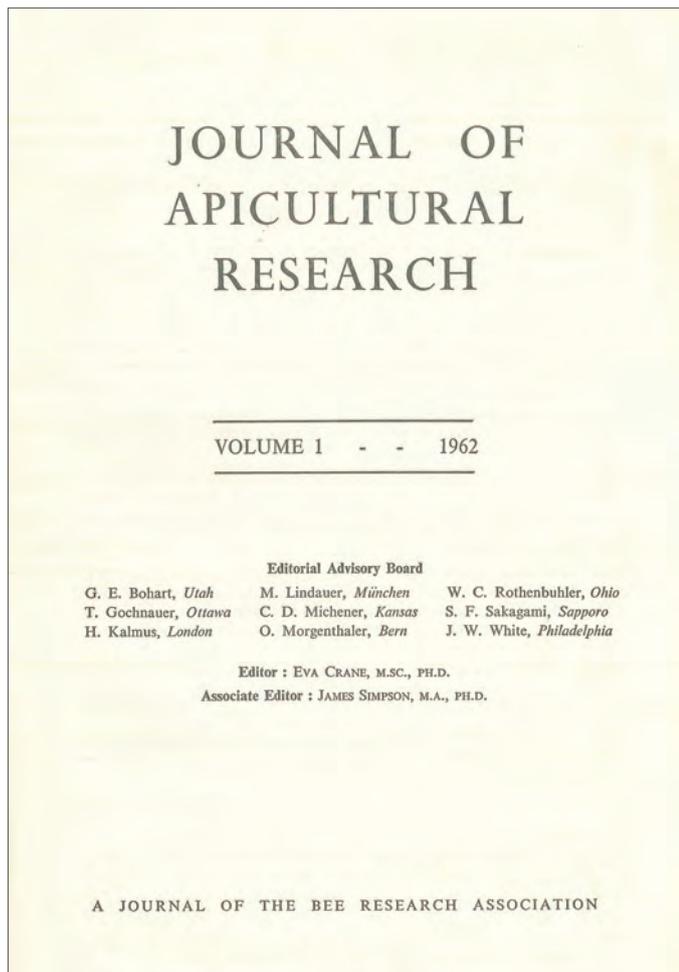


Fig. 2. Cover of Volume 1, Issue 1 of JAR, 1962.

have papers published in English language scientific journals. The first issue of JAR (Fig. 2) included a paper from a Polish author on the hatchability of "lethal eggs" in honey bees (Woyke, 1962). That author, Prof. Jerzy Woyke has recently written of that period (Woyke, 2008): "At this time my English was very bad, so Dr Crane corrected and edited everything". In Bee World (Crane, 1962) Dr Crane described the contents of the first volume of JAR. She wrote: "... on pages 6-13 Dr J. Woyke blows sky high the long accepted concept of 'lethal eggs' produced by inbreeding... Dr Woyke has now shown that the eggs hatch normally provided the nurse bees do not have access to them, and they 'disappear' for quite another - and highly interesting reason, which will be followed up in future numbers of the Journal". Prof. Woyke went on to say: "From that time to the present I have published 65 papers in JAR". His series of papers on diploid drones was launched with this early report that these so-called defective eggs are capable of hatching and developing into triploid drones (Woyke, 1983a). In 1974 in a letter of appreciation marking the twenty fifth anniversary of BRA written to Dr Crane, Prof. Woyke wrote: "The creation of two new journals, Apicultural Abstracts and the Journal of Apicultural Research has raised the standard of bee scientific information to a very high level". As a testimony to his outstanding loyalty to JAR, it is fitting that elsewhere in this issue is the latest important paper from Prof. Woyke, 50 years after his first (Woyke, 2011).

Table 3. Assistant Editors / Editorial Assistants.

Name	Country	Date
Lorraine Beaman	USA	1991-2002
Rebecca Wright	UK	1991-1993
Maxine Hopkin	UK	1994-1999
Pamela Munn	UK	2003-2005
Richard Jones	UK	2006-2007
Sarah L Jones	UK	2007-present
Tony Gruba	UK	2009-present
Toni-Marie Evans	UK	2010-2011

Some notable papers

Tables 1-3 record the contributions of subsequent editors (Figs 3-5), members of the scientific editorial boards and assistants who have assembled the journal, but its subsequent progress is probably best recorded by looking at some of the papers that have been published in those fifty volumes. In the early days of JAR and for many years afterwards, authors would receive postcards from around the world requesting paper reprints of their articles, an indication that

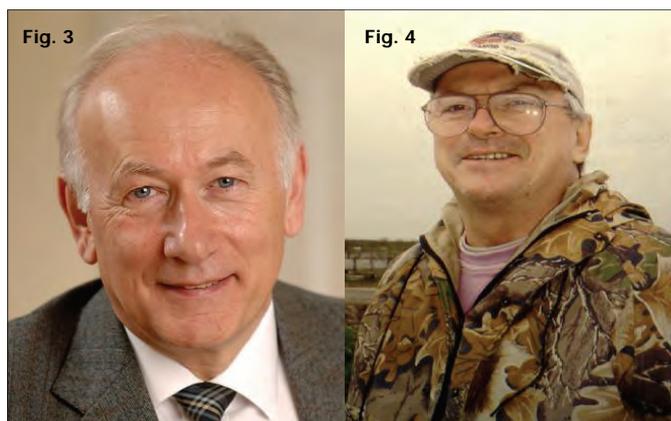


Fig. 3-5. 3. Prof. Robert Pickard (Editor 1986-1990). 4. Dr Tom Rinderer (Senior Editor 1991-2002). 5. Prof. Keith Delaplane (Senior Editor 2003-2007) with Norman Carreck (Senior Editor 2007-present).

somebody in the scientific community was actually reading their work, which would then hopefully be used to prompt further research. The advent of electronic communication and databases has, however, made it much easier to follow this process, as the number of times a paper has been cited in subsequent published studies is now very easy to track. We can see, for example, that of 1,344 papers published in *JAR* between 1976 and 2011, 623 (46%) have been cited more than five times and 55 (4%) have been cited more than 30 times. The most cited paper of all seems to be: "Analysis of propolis: some parameters and procedures for chemical quality control" by Woisky and Salatino (1998), which was cited twenty times in 2011 alone, thirteen years after it was published. This illustrates the point that in contrast to papers in fast moving fields such as molecular biology, where work may become quickly superseded, papers published in *JAR* usually have a very long "half-life", and remain relevant for many years.

Certain topics appear frequently amongst the most cited of *JAR* papers. The journal has, for example, made important contributions to the literature on the parasitic mite *Varroa destructor* (Carreck, 2011), and some of these papers have recently been republished (Martin, 2007). The very first report that *V. destructor* (then thought to be *V. jacobsoni*) could become a problem for the western honey bee *A. mellifera* was published in *JAR* (Delfinado, 1963) as were the pioneering study of *V. destructor* ontology by Ifantidis (1983), and Brenda Ball's demonstration of the harmful association between *V. destructor* with a virus (Ball, 1985; Allen *et al.*, 1986) that adds to the harmful effects of the mite. Other works on the biology of the mite included the study of weight loss and other effects of parasitisation by De Jong *et al.* (1982). The mite has been controlled by a variety of methods, especially chemical, but a number of papers have drawn attention to the contamination of hive products as a major disadvantage of this approach (Thrasyloulou and Pappas, 1988; Bogdanov *et al.*, 1998). In contrast, the topic of breeding bees resistant to *V. destructor* was the subject of a key paper by Spivak and Gilliam (1993).

Other pests and diseases figure prominently amongst the most cited of *JAR* papers. Two key papers on the gut parasites of the genus *Nosema* have included one on sampling techniques for *N. apis* by Fries *et al.* (1984) and, more recently, on the natural distribution of the emerging *N. ceranae* problem in *A. mellifera* (Fries *et al.*, 2006). *JAR* published three important papers on sampling techniques of American foulbrood by Hornitzky and Karlovskis (1989); Alippi (1991) and Hornitzky and Clark (1991).

Over the years, many papers have been published on the biology of honey bees and the means of its study. For example, three papers have featured designs for indoor bee flight rooms to enable biological studies under controlled conditions (Jay, 1964; Van Praagh, 1972; Poppy and Williams, 1999). Honey bee mating behaviour has been frequently covered, including early field studies on *A. mellifera* by Dr

Norman Gary (Gary, 1963), and on *A. cerana* by Prof. Friedrich Ruttner (Ruttner *et al.* (1972), and many papers by Prof. Woyke on the instrumental insemination of *A. mellifera* (e.g. Woyke, 1983b).

The swarming behaviour of bees was an early favourite, with two important papers by James Simpson and colleagues (Simpson and Riedel, 1963; Simpson and Moxley, 1971). Swarming re-emerged with new relevance upon the introduction of the Africanised honey bees into the Americas, as shown in three key papers from Prof. Mark Winston and colleagues (Winston and Otis, 1978; Winston *et al.*, 1979; Otis *et al.*, 1981), and a contribution by Sylvester (1982) providing a means for distinguishing Africanised from European swarms.

From the outset, *JAR* has covered all bee species, not just honey bees, and it has published a number of key papers which have influenced our understanding of the conservation of bumble bees. These include the pioneering study of bumble bee decline in Britain by Dr Paul Williams (Williams, 1982), which compared historical and modern records of incidence, revealing the shocking post-war decline in both the abundance and diversity of bumble bee species, demonstrating that the large central arable area of England now hosts only the six common species of bumble bees. This was followed by two key papers by Dr Mike Fussell and Dr Sally Corbet on the plants visited by bumble bees (Fussell and Corbet, 1991) and their nesting preferences, making use of a survey by members of the public (Fussell and Corbet, 1992). The commercialisation of bumble bees has not been ignored, and a widely cited article on their rearing in captivity was published by Plowright and Jay (1966).

Recent developments

In recent years, the scientific publishing world has changed beyond recognition from that which existed in 1962. In those early days of *JAR*, everything was either written out by hand or typed on mechanical typewriters. Manuscripts were submitted in multiple copies produced with carbon paper and were sent to referees using the postal service. It was a very lengthy process. Diagrams were drawn by hand with the aid of graph paper, tracing paper, stencils, Rotring® ink pens and Letraset® lettering, and then transferred to lead or copper printing blocks. Final copy was laid out by hand, literally using the "cut and paste" process. Finally, authors were sent paper "reprints" of their papers.

The adoption of computers, word processors, electronic mail, and especially the worldwide web, has totally revolutionised the publishing process. Papers are now submitted electronically from around the world, and just as rapidly dispatched to referees. Should a referee not respond, the paper can easily be sent to another. Papers can be typeset electronically using files sent directly from a word processing package to a desk top publishing package. *JAR* has moved with the

times. From Volume 48 in 2009, the journal has been typeset entirely in-house on Microsoft Publisher® software, and catalogued using the Digital Object Identifier (DOI) system. From Volume 49 in 2010, *JAR* became a digital only journal, accessed via the IBRA website, although still available as hard copy by special request and at additional cost. Further improvements are planned.

Following the death of Dr Crane in September 2007, IBRA Council decided that a fitting memorial to her work would be an annual award for the best paper published in *JAR*, to be selected by the editorial team. The first award was made for a 2008 paper dealing with X-ray micotomography as a non destructive technique for assessing the morphology of bees (Greco *et al.*, 2008), followed by subsequent awards for a paper describing the uses of multiple queen honey bee colonies (Zheng *et al.*, 2009), and a paper documenting the decline of honey bees and beekeepers in Europe (Potts *et al.*, 2010).

Issue 47(3) in 2008 (Fig. 6) marked something of a departure for *JAR*, and was a Special Issue entirely devoted to the subject of the small hive beetle *Athina tumida*, edited by Dr Peter Neumann (Swiss Bee Research Centre) and Dr Jamie Ellis (University of Florida, USA) which included a Guest Editorial documenting the distribution, biology and control of that pest (Neumann and Ellis, 2008). This was followed

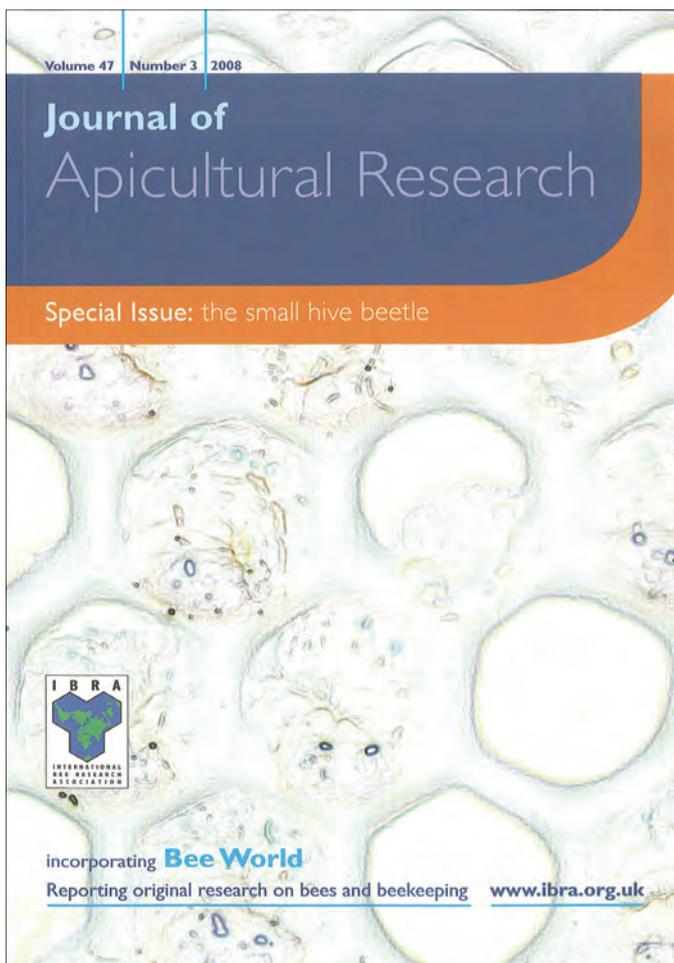


Fig. 6. Cover of Volume 47(3), *JAR* Small Hive Beetle Special Issue, 2008.



Fig. 7. Cover of Volume 49(1), *JAR* Colony Losses Special Issue, 2010.

by Issue 49(1) in 2010 (Fig. 7) which was a Special Issue devoted to the hot topic of colony losses, edited by Peter Neumann and Norman Carreck. The relevance of the issue is shown by the fact that the editorial (Neumann and Carreck, 2010) has already been cited 30 times. Further Special Issues are planned for the future.

The Journal of ApiProduct and ApiMedical Science

From its earliest days, *JAR* included papers on hive products, and these have recently been reviewed (Jones *et al.*, 2011). Some of these papers have been heavily cited, including one on the antioxidant capacity of honey by Frankel *et al.* (1998) and another on the non-peroxide activity of New Zealand honeys by Molan and Russell (1988).

In recent years, it became clear, however, that *JAR* was being sent papers about hive products which whilst being outside the biological scope of the journal, were nevertheless publishable, although on subjects that the editorial team felt wholly unqualified to deal with. The area of Apitherapy is one where good science is often being overshadowed by unsubstantiated claims and dubious marketing of untested products, yet there was no single place where



Fig. 8. Cover of Volume 1, Issue 1 of *JAAS*, 2009.

papers containing good science on the topic could be published. After much deliberation, IBRA launched the *Journal of ApiProduct and ApiMedical Science (JAAS)* in 2009 (Fig. 8) under the editorship of Prof. Rose Cooper (Jones *et al.*, 2011) with a mandate to: “cover research on the six main hive products... [and] publish research on the biologically relevant properties and substances of these products”. *JAAS* has completed its third volume in 2011.

The future

The current Guidelines for Authors states that *JAR* “publishes original research articles, original theoretical papers, notes, comments and authoritative reviews on scientific aspects of the biology, ecology, natural history and culture of all types of bees (superfamily Apoidea) including honey bees, bumble bees, stingless bees and solitary bees”, a mission little changed from that of Volume 1, but we now live in a very different world from that of 1962. Who can say how scientific publishing may change over the next fifty years?

For the working scientist, emphasis has increased greatly on obtaining publications in peer reviewed scientific journals. Whilst 20 years ago, it may have been acceptable to publish only occasional papers, now failure to publish many papers each year may lead to the end of an otherwise successful scientific career, and may also affect

the employing organisation, since publications are crucial in obtaining continuing research funding. This drive to publish more and more papers has ramifications in the number and potentially the quality of the papers submitted to journals such as *JAR*. It also has a direct impact on the workload of our volunteer reviewers and the editorial team, who receive an ever increasing number of papers to consider. IBRA Council and members of the editorial team have recently contributed to an enquiry by the UK Government into the peer review system. Much debate continues as to whether the existing system still works adequately or needs radical reform because it is creaking at the seams (Loxdale, 2011).

Much as scientists need to publish papers, so scientific journals also seek to be awarded a high “impact factor” because they have published “important” i.e. highly cited papers. The result is that journals may become increasingly selective about which papers they will accept for publication, and certain types of papers may be rejected, not because they are bad science, but because they are considered to be of limited interest. To gain additional credibility, scientists also seek to have their papers published in these high impact factor journals, but this desire means that highly specialised journals, which by their very nature cannot be high impact, may not receive the best papers and thereby be starved of material.

The history of *JAR* mirrors the history of some of the most exciting and fruitful decades in bee science. This surge of accumulating knowledge shows no sign of slowing, and IBRA and its journals plan to be there, adapting to new publishing technologies, documenting the ongoing story of bee science, and advocating the highest standards of scientific practice and reporting. IBRA Council Member Dr Peter Neumann has recently commented that with the current interest in bees we are enjoying a “golden age of bee science” with many important papers being written, and *JAR* is therefore very fortunate that it has attracted, and still receives a great many excellent papers for consideration. Let us hope that this continues over the next fifty years of *JAR*.

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My thanks go to Toni-Marie Evans for trawling through back numbers of *JAR* to extract much of the information appearing in the tables, Dr Tom Rinderer (*JAR* Senior Editor 1991-2002) and Dr Fani Hatjina (*JAR* Associate Editor 2006 - present) for sharing their thoughts with me about the most important papers published in *JAR*, and Dr Jay Evans (*JAR* Associate Editor 2008 - present), Prof. Keith Delaplane (*JAR* Senior Editor 2003-2007), Richard Jones (IBRA Director 1996-2009) and Dr Andrea Quigley for helpful comments on the manuscript. I would also like to thank Prof. Charles Michener (University of Kansas, USA), a member of the *JAR* Editorial Board from Volume 1 until 1990, and Prof. Jerzy Woyke (University of Life Science, Warsaw, Poland), a

member of the *JAR* Editorial Board from 1970 - 1990 for their kind wishes on reaching this milestone. Finally, I must thank the vast numbers of scientists who have submitted papers and volunteered as referees over the years. Without them such a publication as *JAR* would not be possible.

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