

# History and author analysis of the World Congresses on Genetics Applied to Livestock Production

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## Abstract

It is almost fifty years since the first World Congress on Genetics Applied to Livestock Production (WCGALP) was convened in Spain in 1974. This paper, targeted for the early-career scientist session, details the history and evolution of WCGALP, and outlines gender composition of the Permanent International Committee, session chairs, plenary and invited speakers, and authors. Data containing 24,351 author records from all WCGALP proceedings, and old programs were used for the analyses. In the early years, there were few women involved in any aspect of WCGALP, however, more recent congresses have featured an increasing proportion of women on WCGALP committees and serving as session chairs. Based on recent data, gender is not playing a determining role in selection of submitted papers for oral presentations. We recommend greater gender diversity on WCGALP committees and encourage early-career scientists to actively participate in WCGALP conferences to further increase the diversity of future congresses.

## Introduction

The idea of World Congresses for specialists working in livestock production was hatched in Spain in the 1960s. It started with a World Congress on Animal Feed held in Madrid in 1966 and 1972. Then in 1974 the first World Congress on Genetics Applied to Livestock Production (WCGALP) was held in Madrid. Starting with the second Congress in 1982, also held in Madrid, the event has been held every four years at locations throughout the world, and this Congress in Rotterdam in 2022 is the twelfth.

The governance of the first WCGALP was under the auspices of the local organizing committee, chaired by Carlos Luis de Cuenca, from the University of Madrid. Alan Robertson from the University of Edinburgh joined Carlos Luis de Cuenca in creating a Permanent International Committee (PIC) for WCGALP in 1974, and he was the first President of this committee which has traditionally been primarily responsible for evaluating bids for the location of the next WCGALP. William (Bill) Hill also from the University of Edinburgh, later served as President of this committee for many years. Honorary members of the PIC were Gordon Dickerson and Bill Hill.

The format of WCGALP has varied throughout the years. At the first WCGALP there were six main topics: 1) Factorial Genetics; 2) Cytogenetics; 3) Biochemical Genetics; 4) Quantitative Genetics; 5) Genetic Modelling with Laboratory Animals; and 6) Applied Genetics to Breeding programs with separate sessions for dairy cattle, beef cattle, sheep, swine/pig and poultry breeding programs. The format at that event included an invited speaker leading off each of these sessions, and invitations to speak were typically made on the recommendation of the local session organizers. Subsequent conferences followed a similar model, some featuring invited plenary speakers, and over time new fields such as transgenic animal research, molecular genetics, and genomics were included as they became established. At WCGALP 2022, the focus of sessions has been shifted to also include addressing a diverse

range of societal challenges, relevant for animal breeding, rather than focusing solely on development of new methodologies. This change in topics at Congresses reflects the tremendous developments in the field of genetics and animal breeding in the almost 50 years since the first WCGALP, and moreover profound changes in both society and academia during this time.

## Materials & Methods

Information about authors of papers presented at WCGALP was obtained from the WCGALP digital archive (<http://www.wcgalp.org/>). Data contained 24,351 author records detailing the author's name, the year the paper was presented, the title of the paper, and the volume in which the proceedings paper was published. The first name of authors was run through genderize.io (<https://genderize.io/>), to predict the gender of a person given their name. The gender of plenary speakers prior to 2014, and the members comprising the PIC were manually curated. Further, individuals who were authors on 15 or more WCGALP proceedings papers were examined as a group. If gender was unassigned for authors it was curated manually based on first-hand knowledge, or using the internet-based ISI Web of Science to search for other same-authored papers that provided first names, and/or Google to locate profiles or images of them. Prior to 2014, only initials were available for WCGALP authors, which made it difficult to designate the gender of these authors and gender was assigned unknown. Hence there is less confidence associated with data prior to these two most recent conferences.

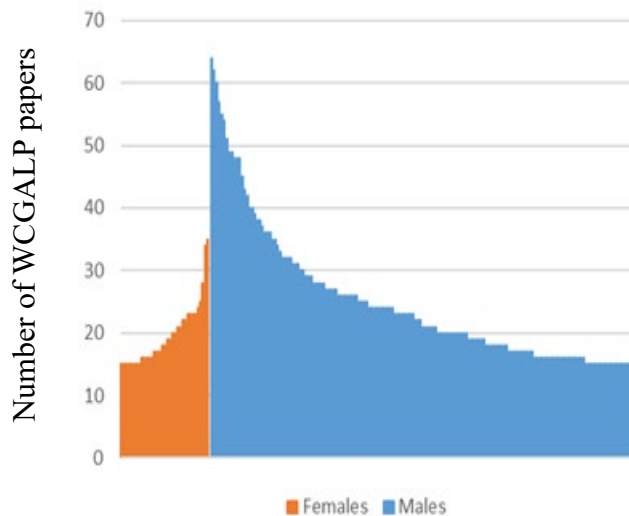
## Results

For many years both the PIC and the local organising committees (LOC) were comprised predominantly of men. To our knowledge, Helen Newton Turner was the first female invited session speaker in 1974 and member of the PIC, Susanne Hermesch was the first woman to be voted President of this Committee in 2018, and Yvette de Haas was the first female co-leading a LOC in 2022. There has been a continuous increase in the proportion of women on the PIC of WCGALP from 5% in 2010, 15% in 2014, 26% in 2018 and 33% in 2022.

The local organizing committee decides on plenary speakers and session chairs which have both included more women in 2014 and 2018 (Table 1), reflecting an increased awareness of gender balance in key-note presentations or positions. The first invited female plenary speaker was Jenny Marshall Graves in Australia in 1998. The number of proceedings papers increased over time (Table 2), with the exception of conferences in Australasia where there was a decrease, likely due to the travel involved for the majority of European and North American participants to attend these conferences. There has been an increase in the number of authors per paper, mirroring a trend whereby the average number of co-authors per paper published has increased steadily over the past century in all scientific disciplines.

A total of 201 authors had 15 or more papers presented at multiple WCGALP. Jack Dekkers who first presented in 1994 was the most prolific author with 64 papers, closely followed by John Woolliams, who first presented in 1990, with 62. The most prolific female author was Lucia Albuquerque with 35 papers who first presented in 1994. Two authors, Mike Goddard and Moshe Soller, had papers at each of the first 11 WCGALP spanning 1974 to 2018, while Karin Meyer was the female author with the highest WCGALP attendance, participating in conferences from 1982 to 2018. Figure 1 shows the breakdown of the most prolific authors by gender. There was a gender difference ( $p < 0.005$ ) in the average number of papers per author in this highly prolific group. For example, of authors in this group that were first-time authors in 2002 and are therefore likely of a similar age, male authors ( $\bar{x} = 24.2 (\pm 1.4)$ ,  $n=35$ ) had on average 5-6 more papers than female authors ( $\bar{x} = 18.7 (\pm 0.8)$ ,  $n=16$ ). Of the 2006 first-time

authors, 10 male and one female author had 15 or more papers by 2018, and of the 2010 first-time authors only two male authors had 15 or more papers by 2018.



**Figure 1. Number of WCGALP proceedings papers sorted by author gender for authors with at least 15 papers.**

Encouragingly, of the 2014 first-time authors, a single female author, Daniela Lourenco, had 15 or more papers by the 2018 congress. Approximately one quarter of all the 2014 first-time authors (673 men, 467 women), returned as an author on a paper presented at the 2018 conference, 151 and 136, respectively. Of the 801 papers that were originally submitted to the 2018 New Zealand conference, 59% from male authors and 41% from female authors, around 80 were withdrawn, with an approximately equal number from both genders. Of those papers accepted, 38% were presented in an oral session, irrespective of the gender of the author.

## Discussion

The rationale for preparing this paper for the early-career scientist session was our experiences and observations as female scientists both with a PhD awarded in 1997 in a traditionally-male scientific discipline. The dearth of women in the WCGALP congresses initially can possibly be explained by the number of women actively participating in the field over time. Nevertheless, it has generally been observed that the proportion of female speakers differs dramatically by the gender of the organizer, with male-organized symposia having fewer female speakers than those organized by women, or a mix of genders (Isbell *et al.*, 2012). Further, blinded submissions of abstracts (as to author and institution) was also found to result in more women being chosen as symposium speakers (Newkirk *et al.*, 2005). We recommend improving the involvement of women, early-career scientists, scientists from developing countries and other minorities in key positions involved in the planning and organisation of future WCGALP events to ensure greater diversity of invited speakers. It would also be helpful to ask authors include their ORCID digital identifier when submitting proceedings papers to facilitate analyses such as those presented in this paper in the future.

There are some encouraging trends in the data we analysed. The days of all-male plenary sessions seem to be a thing of the past, and the proportion of female session chairs and invited speakers gradually increased over time. And based on recent data, gender is not playing a role in selection of submitted papers for oral presentations, nor in the observed willingness of conference attendees to attend subsequent conferences. This offers tremendous opportunities for early-career scientists to raise their profile at WCGALP events independent of gender. Inviting speakers is risky for session chairs and organisers, if the speaker is not well known. This naturally decreases the likelihood of unfamiliar scientists to be invited. We encourage all early-career scientists to speak up at WCGALP, to ask questions and to get noticed. We believe that both of these aspects, greater gender diversity of organising committees or chairs and increased courage of early-career scientists to get noticed will lead to greater diversity of session chairs, invited speakers, authors and attendees at future WCGALP conferences.

**Table 1. The number (N) of plenary speakers, session chairs and invited speakers along with percentage (%) of females for each group where gender of first author was known.**

Year	Location	Plenary		Chairs		Invited	
		N	%	N	%	N	%
1974	Madrid, Spain	No plenaries		10	0	67	2
1982	Madrid, Spain	No plenaries		10	0	48	0
1986	Nebraska, USA	No plenaries		22	0	74	0
1990	Edinburgh, Scotland	4	0	34	3	74	4
1994	Guelph, Canada	No plenaries		15	0	73	3
1998	Armidale, Australia	5	20	29	7	58	12
2002	Montpellier, France	3	0	38	10	50	8
2006	Belo Horizonte, Brazil	3	0	22	0	78	13
2010	Leipzig, Germany	8	13	34	18	44	22
2014	Vancouver, Canada	5	0	36	6	108	24
2018	Auckland, New Zealand	4	50	53	23	34	24
2022	Rotterdam, The Netherlands	6	50	156	32	15	27

**Table 2. Number of papers (P) and authors (A), authors per paper (A / P) and number of authors with gender known or unknown (N/A) for the WCGALP. Cells shaded grey are associated with low confidence in the correct gender identification of the author.**

Year	Location	P	A	A / P	Males	Females	N/A	%Females <sup>1</sup>
1974	Madrid, Spain	226	399	1.8	209	3	187	1%
1982	Madrid, Spain	364	755	2.1	403	6	346	1%
1986	Nebraska, USA	277	627	2.3	343	11	273	3%
1990	Edinburgh, Scotland	344	784	2.3	435	25	324	5%
1994	Guelph, Canada	946	1,229	1.3	649	27	553	4%
1998	Armidale, Australia	257	858	3.3	419	25	414	6%
2002	Montpellier, France	949	3,812	4.0	1984	86	1742	4%
2006	Belo Horizonte, Brazil	868	3,899	4.5	1978	161	1760	8%
2010	Leipzig, Germany	789	3,477	4.4	1930	186	1361	9%
2014	Vancouver, Canada	946	4,456	4.7	2893	1239	324	30%
2018	Auckland, New Zealand	753	4,055	5.4	2580	1187	288	32%

<sup>1</sup> Percentage based on authors with gender known

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