A brief history of the International Grassland Congress

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Key points

1. Nineteen International Grassland Congresses met over the period 1927-2001 in every continent except Africa. Scientists from North America, Western Europe and Australia and New Zealand dominated proceedings.
2. Analysis of 6 representative Congresses indicates a considerable homeostasis of disciplinary content. The plant genetic base for grassland improvement, plant physiology, plant ecology and soil science contributed 46 to 57 per cent of papers, which were mainly complemented by studies of grazing management and animal production from forage.
3. Environmental science, systems theory, socio-economic perspectives and technology transfer emerged with more force in recent Congresses.

Keywords: International Grassland Congress, history, scientific disciplines, plant and animal production, environment

Locations and attendance

The dates and locations of the Congresses are listed in Appendix Table 1. The International Grassland Congress first met in Germany from 20-31 May 1927. The principal participants were 16 scientists from Austria, Denmark, Finland, Germany, Norway, Sweden and Switzerland, who assembled in Bremen and made a study tour through north-west Germany, visiting Emden, Berlin and Dortmund before taking the train to Leipzig. Here there were two days of scientific discussion at the Zoo, revisited subsequently as the site of the 50th Anniversary XIII Congress in 1977. The Congress under the presidency of Prof. A. Falke of Leipzig had a further study tour through grassland production sites in Saxony before dissolving at Dresden.

The second Congress, which met in 1930 in Sweden and Denmark under the presidency of Dr A. Elofson of Uppsala was enlarged to 58 participants from 13 countries (including Canada). The third Congress in Switzerland in 1933 with Prof. A. Volkart of Zurich as President had scientists from Turkey and South Africa present, but it was not until the IV Congress in 1937 at Aberystywyth, United Kingdom, that the meeting could claim a global constituency. There were some 365 participants from 37 countries; all 11 regions of the world as defined by the 1977 International Grassland Congress Constitution were represented with the exception of the Middle East. The leadership of R.G. Stapledon of the Welsh Plant Breeding Station was pre-eminent. At this meeting it was agreed that the funds of the International Grassland Congress Association be banked in Germany and that the next Congress be held in the Netherlands in 1940. The intervention of the Second World War delayed the V Congress until 1949 and the funds of the Association were not recovered.

The VI International Grassland Congress, held at State College, Pennsylvania, USA in 1952, built on the European foundations of the movement to enlarge its scientific content and global representation, and accorded a new maturity. The world regions with an established history of grassland research (North America, Western Europe, Australia and New Zealand) accounted for 75% of the 271 scientific papers presented, and the participation of other regions increased to 25%.

The location of subsequent Congresses usually alternated between continents: America (4), Oceania (3), Asia (1), Europe (5) but no Congress has been held in Africa. The VII Congress in 1956 at Palmerston North, New Zealand, had a restricted representation but the VIII Congress at Reading, UK (591 participants from 53 countries), indicated the continued strength of grassland science. At this Congress an Executive Committee representative of eight regions of the world was elected with a rotating membership so that members would serve for a period covering the two intervals between three Congresses. This Committee was charged with providing a continuing organisation which would advise future host country committees. The full membership of the Congress voted for the IX Congress venue of Brazil, and this was held in 1965 at São Paulo, the first Congress to be located in a tropical country. In Brazil it was decided that the venue of the XI Congress would be Australia (118 votes, Canada 63 votes, USSR 63 votes). The X Congress moved closer to the Arctic Circle in 1966 at Helsinki, Finland, where USSR (128 votes) was selected over Canada (108 votes) for the XII Congress site. The designation of Executive Committee was altered to that of a "Continuing Committee", which was *inter alia* given the responsibility "to select the host country for the forthcoming Congress and to announce the name of that host country at the intermediate Congress". The XI Congress was mounted in 1970 at Surfers' Paradise, Queensland, Australia.

The question of the venue of the XIII Congress aroused controversy at the XII Congress in 1974 in Moscow. The Continuing Committee, empowered by the Constitution adopted in 1966 at Helsinki, determined the Republic of Ireland as the venue. This decision was challenged by the Host Committee in Moscow who put the question to a free vote of full Congress members, of whom 64% were from the northern Eurasia region. This resulted in a decision for the XIII Congress to be held in 1977 at Leipzig, German Democratic Republic. (It is reported that at this meeting a USSR official on the platform turned to R.J. Bula, the North American proxy delegate on the Continuing Committee, when the vote was announced and asked "So how do you enjoy democracy?"). A further resolution led to the promulgation of a new constitution which was adopted at the Leipzig Congress and which reaffirmed the power of the Continuing Committee to determine future venues, subject to one country-one vote procedure at the Congress in the event of a disagreement in the Continuing Committee. The Continuing Committee was enlarged to representatives of 11 regions and an additional representative from the previous host country.

S.C. Pandeya, the outgoing chairman of the Continuing Committee, had expected to invite the XIV Congress to India, but the defeat of the Gandhi government by Mr Desai put paid to this proposition and no invitation from other countries was forthcoming. Canada had previously sought to host congresses but 1977 was not a propitious time to find support. The American Forage and Grassland Council, led by R.F. Barnes and J.E. Baylor, ventured in faith and the XIV Congress at Lexington, Kentucky, USA, resulted in 1981. The XV Congress in 1985 was the first Congress to be held in Asia and at Kyoto, Japan, a large delegation of scientists from China attended for the first time.

Previous Congresses in Europe had been held in cold northern latitudes and the XVI Congress in 1989 at Nice, France, was the first Mediterranean location and attracted a higher proportion of participants (13%) from the designated Mediterranean region countries, whilst France provided 24% of the attendance. The XVII Congress in 1993 was unusual in that it arose from the joint invitation of New Zealand and Australia, and its locations in Palmerston North, Hamilton, and Christchurch, New Zealand, and Rockhampton, Queensland, provided a range of ecological conditions including both temperate and tropical pastures. This was the largest and most representative Congress with 1200 delegates from 82 countries. The scientific contribution and leadership of indigenous participants from the developing countries increased substantially at the XVI and XVII Congresses; in the early Congresses their rather meagre representation often arose from expatriate scientists from developed countries. The invitation of Canada to host the XVIII Congress in 1997 was accepted by the 1993 Continuing Committee, and this led to a similarly large and representative Congress. A resolution was adopted at this Congress to continue to explore the possibilities for closer collaboration with the International Rangeland Congress (IRC). The XIX Congress took place in 2001 at São Pedro, São Paulo, Brazil. An up-dated and revised Constitution was adopted at that Congress. The XX Congress is being held in 2005 in the Republic of Ireland and the United Kingdom.

Table 1 Regional participation (per cent) in International Grassland Congresses

Region	Period					
	1927-1937	1949-1952	1956-1966	1970-1981	1985-1993	1997-2001
North America	4	27	19	21	15	19
Central America	<1	3	2	2	1	3
South America	<1	2	20	2	4	25
Southern Asia	<1	2	<1	1	2	4
Oceania	1	6	15	21	22	15
East Asia	<1	<1	<1	3	23	9
Middle East	<1	<1	<1	<1	1	3
Mediterranean	1	3	1	2	6	5
Western Europe	87	54	36	27	20	11
Northern Eurasia	3	0	4	18	2	3
Africa	2	3	2	1	3	5

The regional participation (Table 1) is estimated for non-orthogonal periods designated to coincide with the Congresses chosen for later discussion of the evolution of thematic content. The naming of the regions in Table 1 has been modified to reflect current understanding. Changes in regional representation partly reflect the location of Congresses in each period but there has never been strong participation from the countries of Central

America, Middle East and Africa. More detail is available in Humphreys (1997). Office bearers of the Congresses are listed in Appendix Table 1 and members of the Congress committees are listed in Appendix Tables 2 and 3.

The International Rangeland Congress

The management of rangelands, focused on natural pastures in the arid and semiarid zones, has always been a topic at International Grassland Congresses and has received varying attention. However, some scientists working in this general area considered there was a need for a separate international meeting directed to developing a better science of the manipulation, improvement and utilisation of rangelands. This was exacerbated in the USA by the dichotomy of effort between members of the Society of Range Management and of the American Forage and Grassland Council, whose primary interests were in sown grasslands. The decision to form a separate organisation which would mount International Rangeland Congresses was further stimulated by the decision at the XII International Grassland Congress in 1974 to reject the Continuing Committee's acceptance of the Republic of Ireland as the venue for the XIII Congress and to retain the Congress in what was perceived as the Eastern Bloc venue of the German Democratic Republic.

The first International Rangeland Congress was held in 1978 at Denver, Colorado, USA, and was succeeded in 1984 by the second Congress at Adelaide, Australia. This was attended by 499 participants from 42 countries; of these 79% came from Oceania, North America and Western Europe. The third Congress in 1988 met in New Delhi, India, and the fourth Congress was held in 1991 at Montpellier, France, whilst the fifth Congress returned to the USA in Utah. Further Congresses were held in Townsville, Australia, and Durban, South Africa. Reciprocal representation on the two Congress Continuing Committees was arranged from 1981, and plans are being made to hold a joint IGC/IRC Congress at Hohhot, Inner Mongolia, China, in 2008, which would integrate the thrust of the two movements.

Changes in the balance of themes

Overview

The changing themes which have occupied scientists at International Grassland Congresses were analysed by identifying 110 topics grouped within 10 main themes, and additionally including four miscellaneous themes: synoptic papers, biometrics, agricultural engineering and animal production not specifically related to grassland improvement (Table 2). Papers presented at Congresses were allocated to each sub-theme according to its major content; this was not necessarily the theme of the Congress session to which it may have been allocated for convenience.

The content of six Congresses that were held at a mean interval of 11 years from 1937 to 2001 was studied; 1937 was chosen as the first Congress that could claim a good international status. All six Congresses accepted voluntary papers and were held in regions with a history of research in grassland science.

This analysis revealed a considerable homeostasis of disciplinary content over the 64 years. The science of grassland improvement has relied first on an interest in its plant genetic base, and plant genetics, plant physiology, plant ecology and soil science contributed 46 to 57 per cent of the subject matter at all six Congresses. Animal nutrition and systems of animal production arising from study of the animal-plant-soil interface were the other key preoccupations of grassland scientists, whilst environmental science, systems theory and socio-economic perspectives emerged with more force in recent Congresses.

The 1937-1952 period

The general theme of the first subject in Table 2, which was designated as styles of grassland development, included the papers with general or integrative themes which were insufficiently specific to be allocated elsewhere and whose main interest was regional or local. These constituted 19% of papers in 1937 and mainly dealt with humid or sub-humid temperate grasslands; in 1952 this category decreased to 12% with a predominance of non-specific tropical papers. The balance of content focused on intensity of land use, tree crops with pastures, leys and turf.

The plant genetic basis for grassland development in 1937 was oriented to evaluation of and selection within improved species; in 1952 there were more papers on hybridisation, induced polyploidy, disease resistance and certification of seed for varietal purity. Edaphic constraints on grassland development in 1952 were defined less

in terms of general fertiliser needs and responses and more in terms of specific nutrients, including sulphur, and soil toxicities; soil conservation and watershed management became significant emphases. More interest in the physiology of flowering and seed production emerged, whilst in plant succession, the control of weed and shrub encroachment and the production of inventories of grassland resources were of significant interest in grassland ecology.

In the 1952 Proceedings studies of selective grazing and foraging strategy, stocking rate and forage allowance, and the methodology of grazing experiments appeared. More sophisticated approaches to nutritive value of forage were evident in the attention to energy value, digestibility and intake, mineral content, and anti-quality factors. Continuity of forage supply was addressed through irrigation and techniques of crop processing, which were especially dependent upon innovations in agricultural engineering. Characterisation of climate emerged as a topic, as did the transfer of technology to farmers.

The 1966 Congress

The trend to fewer general papers of regional interest continued, especially at this Finnish venue with respect to tropical grasslands. Papers dealing with specialist techniques of plant breeding such as induced polyploidy were again presented. The intensive use of fertiliser N was a new emphasis and there were 19 papers on this topic. Plant physiology was accorded greater importance through papers on growth analysis, tillering, plant response to defoliation, and the role of carbohydrate "reserves", but there were fewer papers on plant ecology.

Stocking method, stocking rate and forage allowance were further addressed, together with the spatial transfer of nutrients under grazing. Mixed grazing and the innovative choice of animal species were canvassed. Nutritive value received increased attention relative to 1952, especially in relation to forage intake, digestibility and anti-quality factors. Animal responses to systems of forage conservation were described and systems modelling in grassland research appeared as a topic (Table 2).

The 1981 Congress

This Congress was marked by considerable advances in tropical pasture science, and 133 of the 480 papers presented bore directly on grassland development in the tropics and subtropics, mainly in specialist areas. Styles of grassland development embraced interest in the intensity of land use, integration of land classes, deforestation and woodland management, long-term trends in production, the use of shrub legumes and intercropping.

Wide approaches to the improvement of the plant genetic base were enunciated which displayed increased emphasis on species evaluation, the conservation of germplasm, and the identification of elite material, whilst *in vitro* embryo culture signalled the nascency of molecular biology.

Table 2 Themes represented at International Grassland Congresses (per cent papers with main theme)

Year of Congress	1937	1952	1966	1981	1993	2001	Mean
Congress number	IV	VI	X	XIV	XVII	XIX	
Subject theme							
Styles of grassland improvement; regional themes	23	18	10	9	16	8	14
Plant genetic base	23	20	19	21	25	17	21
Edaphic constraints	19	13	14	14	11	12	14
Perspectives from plant physiology	9	9	17	15	14	11	13
Ecology of grasslands	6	10	4	6	7	6	7
Grazing systems	4	4	8	8	8	16	8
Nutritive value	4	7	15	10	7	13	9
Continuity of forage supply	7	11	8	10	5	11	9
Systems approach	-	0.4	1	3	3	3	2
Socio-economic perspectives	1	3	3	4	4	3	2
Miscellaneous	3	6	3	1	2	1	3
Number entries	69	256	220	480	943	499	

Scientists at all six Congresses emphasised the role of legumes and of biological N fixation in grassland production; associative mechanisms of N fixation were mentioned at the 1981 Congress, and soil N, together with nutrient cycling, stream pollution, soil toxicities and salinity received increased attention. Perspectives from plant physiology incorporated more interest in pathways of photosynthesis, efficiency of conversion of radiation, moisture use, stress resistance, growth regulators and the understanding of constraints to pasture establishment. The dynamics of change in plant communities, the role of fire and the control of shrub encroachment figured in grassland ecology, and some 91 papers were directed to the conservation and improvement of natural grasslands.

The influence of grazing on the balance of legumes and grasses and studies of foraging strategies figured in the 1981 Congress. The effects of endophytes, the potential of growth regulators and of chemical processing of crop materials were canvassed. Modelling of grassland systems and the development of decision support systems emerged as strong emphases, whilst technology transfer and the development of the human skills base in grassland science were accorded more significance.

The 1993 Congress

A wider series of topics was structured in depth at the 1993 Congress than had occurred previously. Environmental science was a strong feature of the Congress and the fashionable term `sustainable development' was explored in its various facets: the properties of systems of land use of varying intensity, tree crops with pastures, alley farming, the role of leys, relict areas, deforestation and woodland management. Atmospheric pollution and global warming, stream pollution, nutrient leaching and nutrient cycling were components of the agenda, whilst a recurrence of interest in organic matter and soil biological activity reinforced these trends.

Studies of the genetic basis of grassland improvement included more attention to the definition of criteria of merit and of disease resistance, and the rise of genetic engineering and of molecular biology in the allocation of research resources was evident. Many of the themes previously attacked in plant physiology continued from 1981, with more attention to the control of flowering and the processes of seed production. In grassland ecology the dynamics of change in plant communities, the utility of state and transition models and the use of remote sensing in producing inventories and current assessments of grassland resources figured strongly.

The perennial themes within the concepts of nutritive value, the devising of grazing systems and the maintenance of continuity of forage supply were elaborated further but in a new context of this description within systems theory.

The socio-economic perspectives which emerged at the 1981 Congress were enlarged by reference to social equity in grassland development, the participation of farmers in grassland research, and to the larger canvases of institutional policies with respect to resource transfer and international trade.

The 2001 Congress

A return to Brazil, 36 years after the IX Congress, revealed a much increased investment in grassland research in the countries of South America. The expense of travel was one factor limiting attendance, and c.700 scientists from 67 countries met in congenial social and intellectual circumstances at São Pedro, São Paulo.

The traditional 1GC themes of plant improvement, ecophysiology, soil fertility and plant nutrition were complemented by studies of grazing ecology and management, forage nutritive value, continuity of forage supply and fodder conservation. However the trend at recent Congresses to reduce the emphasis on maximising efficient animal production from grassland and to pay greater attention to the sustainable use of grassland as an environmental resource continued. There were fewer general papers on regional themes (Table 2), reflecting an increasing sophistication and specialisation of grassland research and perhaps the growth of regional meetings elsewhere, sometimes stimulated under the aegis of the International Grassland Congress.

At this Congress many topics concerned with the wider aspects of land use were canvassed: de-intensification with grasslands, especially in relation to the policies of the European Community, deforestation, grassland degradation, the maintenance of biodiversity and the role of agro-silvipastoral systems. Increases in grassland growth and legume nitrogen fixation due to atmospheric carbon dioxide enrichment were quantified, together with speculation about the associated changes in climate. Socio-economics of pastoral development and the constraining effects of trade policies on grassland production were examined. The development of pragmatic information and analytical systems were central both to the efficient use of research resources and to the

adoption of grassland improvement, whilst the dynamics of technology transfer and its basis in interactive education were recognised.

These trends will be intensified at the XX Congress in 2005 when only about a third of invited papers will deal with themes of grassland production and the overall title of 'Grasslands – a Global Resource' will embrace many environmental topics such as biodiversity, carbon sequestration and the best uses of water. The basic targets of food security, reduction of rural poverty and better livelihoods arising from improved grassland management and altered socio-economic policies will be discussed.

A central experience of grassland scientists over the decades under review is that the International Grassland Congresses have helped people working in specialist areas to conceptualise their work in wider contexts. The great world movement of International Grassland Congresses has delivered better managed ecosystems, greater equanimity in rural communities and more efficient production of food and fibre.

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Reference

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Appendix

Office bearers of the International Grassland Congresses

Appendix Table 1 Presidents and Chairpersons of Continuing Committee of IGC*

Congress		President	Chair of Continuing Committee
I	Leipzig, Germany 1927	A Falke	
II	Sweden/Denmark 1930	A Elofson	
III	Switzerland 1933	A Volkart	
IV	Aberystwyth, UK 1937	RG Stapledon	
V	Netherlands 1949	DS Huizinga	
VI	Pennsylvania, USA 1952	PV Carden	
VII	New Zealand 1956	B Levy	
VIII	Reading, UK 1960	HG Sanders	
IX	São Paulo, Brazil 1965	AJR Filho	
X	Finland 1966	P Saarinen	HA Steppler, Canada
XI	Australia 1970	EM Hutton	RM Moore, Australia
XII	Moscow, USSR 1974	PI Morosov	DE McCloud, USA
XIII	Leipzig, GDR 1977	R Lemke	SC Pandeya, India
XIV	Kentucky, USA 1981	RF Barnes	WR Childers, Canada
XV	Kyoto, Japan 1985	I Nikki	LR Humphreys, Australia
XVI	Nice, France 1989	J Picard	Y Maki, Japan
XVII	Australia/New Zealand 1993	RW Brougham, NZ	D Crespo Portugal/FAO, Italy
XVIII	Canada 1997	BR Christie	T Nolan, Ireland
XIX	São Pedro, Brazil 2001	SC da Silva	RJ Clements, Australia
XX	Ireland/UK 2005	J Flanagan, Ireland	V Allen, USA

*Presidents were designated by Host Country; Chairpersons of Continuing Committee were elected at the end of the Congress preceding the listed Congress

Appendix Table 2 Executive (1960-1965) and Continuing (1966-1974) Committee membership

Region	VIII Reading 1960	IX São Paulo 1965	X Helsinki 1966	XI Australia 1970	XII Moscow 1974
North America	K Rasmussen Canada	K Rasmussen Canada	DE McCloud USA	DE McCloud USA	WR Childers Canada
Central America	WF Kugler Argentina	GI da Rocha Brazil	GI da Rocha Brazil	F Perez-Infante Cuba	F Perez-Infante Cuba
Oceania	JG Davies Australia	RM Moore Australia	RM Moore Australia	RHM Langer NZ	RHM Langer NZ
Southern Asia	S Emasiri Thailand	S Emasiri Thailand	-	SC Pandeya India	SC Pandeya India
East Asia	T Yamada Japan	T Yamada Japan	S Nishimura Japan	S Nishimura Japan	Y Maki Japan
Mediterranean, Near East	G Haussmann Italy	JVC Malato-Beliz Portugal	JVC Malato-Beliz Portugal	J Cizek Yugoslavia	J Cizek Yugoslavia
Europe	TA Robotnov USSR	TA Robotnov USSR	DFR Bommer W Germany	DFR Bommer W Germany	RJ Wilkins UK
Africa	CEM Tidmarsh South Africa	L Mukendi Congo	L Mukendi Congo	JA Agyare Ghana	JA Agyare Ghana
Host Country Representative	-	AR Filho Brazil	P Saarinen Finland	EM Hutton Australia	MA Smurygin USSR

Appendix Table 3 Continuing Committee membership from 1977

Region	XIII Leipzig 1977	XIV Lexington 1981	XV Kyoto 1985	XVI Nice 1989	XVII NZ/Aust 1993	XVIII Canada 1997	XIX São Pedro 2001
North America	WR Childers Canada	RF Barnes USA	RF Barnes USA	R Michaud Canada	R Michaud Canada	V Allen USA	V Allen USA
Central America	JJ Paretas Cuba	RA Martinez Mexico	RA Martinez Mexico	F Funes Cuba	F Funes Cuba	L Ramirez Mexico	L Ramirez Mexico
South America	A Gallardo Venezuela	A Gallardo Venezuela	C Lascano Colombia	C Lascano Colombia	EA Serrao Brazil	EA Serrao Brazil	R Vera Chile
Southern Asia	Vacant	IM Nitis Indonesia	IM Nitis Indonesia	P Singh India	P Singh India	C Phaikaew Thailand	C Phaikaew Thailand
Oceania	LR Humphreys Australia	LR Humphreys Australia	RW Brougham NZ	RW Brougham NZ	RJ Clements Australia	RJ Clements Australia	G Sheath NZ
East Asia	Y Maki Japan	Y Maki Japan	Z Tingchen China	Z Tingchen China	Dong Am Kim S Korea	Dong Am Kim S Korea	M Goto Japan
Middle East	F Tosun Turkey	F Tosun Turkey	AET Osman Syria	AET Osman Syria	M Munzur Turkey	M Munzur Turkey	H Arzani Iran
Mediterr-anean	A Corleto Italy	A Corleto Italy	D Crespo FAO Italy	D Crespo FAO Italy	E Piano Italy	E Piano Italy	M Vaz Lourenco Portugal
Western Europe	RJ Wilkins UK	A Hentgen France	A Hentgen France	T Nolan Ireland	T Nolan Ireland	A Peeters Belgium	A Peeters Belgium
Northern Eurasia	VG Iglovikov USSR	VG Iglovikov USSR	I Vinczeffy Hungary	I Vinczeffy Hungary	R Dapkus Lithuania	R Dapkus Lithuania	G Nagy Hungary
Africa	VA Oyenuga Nigeria	VA Oyenuga Nigeria	EA Asare Ghana	EA Asare Ghana	B Dzowela Zimbabwe	B Dzowela Zimbabwe	AB Orodho Kenya
Host Country Represent ative	E Wohjahn GDR	JE Baylor USA	Y Maki Japan	A Hentgen France	J Hodgson NZ	R Michaud Canada	SC da Silva Brazil