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## Joint International Grassland and International Rangeland Congress Kenya 2021: Grasslands Summary

James L. Klotz  
*USDA Agricultural Research Service*

J. H. Bouton  
*University of Georgia*

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The XXIV International Grassland Congress / XI International Rangeland Congress (Sustainable Use of Grassland and Rangeland Resources for Improved Livelihoods) takes place virtually from October 25 through October 29, 2021.

Proceedings edited by the National Organizing Committee of 2021 IGC/IRC Congress

Published by the Kenya Agricultural and Livestock Research Organization

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## Joint International Grassland and International Rangeland Congress Kenya 2021: Grasslands Summary

Klotz, J. L.<sup>1</sup> ; Bouton, J. H.<sup>2</sup>

<sup>1</sup> USDA - Agricultural Research Service, Forage-Animal Production Research Unit, Lexington, KY, USA

<sup>2</sup> Institute of Plant Breeding Genetics and Genomics, University of Georgia, Athens, GA, USA;

**Key words:** cultivated grassland; livestock; production; sustainability

### Abstract

This summary used as its main sources the plenary and keynote papers and talks in Sub-theme 2: Forage Production and Utilization and Sub-theme 3: Livestock Production Systems as well as a sampling of oral talks presented at the XXIV International Grassland Congress (IGC). This IGC was held virtually and jointly with the International Rangeland Congress and hosted in Nairobi, Kenya during 23-29 October 2021. The XXIV IGC was also the first to be held on the African continent in Congress' 94-year history. The summary is further focused on that information presented under the concept "cultivated grasslands" (e.g., a small number of species exposed to high management inputs) and is independent of the rangeland summary presented elsewhere in these proceedings. As with all previous IGCs, pasture productivity, quality, and persistence were emphasized, but understandably, mainly for aspects relevant to Africa and the tropics. However, carbon sequestration, pasture resilience, adaptation, and greenhouse gas mitigation were addressed as part of cultivated grassland management. These additional concerns will challenge everyone as new technological advances are deployed into global agriculture. Impacts on social, environmental, and economic issues remain important, but ill-defined. Future considerations include improving research and out-reach programs for the tropics, but especially adaptation of both tropical and temperate systems to projected climate change issues such as higher temperatures and inconsistent rainfall for all geographies. Fitting the current sustainability narrative to the science and not the other way around is important going forward. Finally, one must keep in mind how pastoralists and producers will be impacted with any future research projects and policy changes.

### Introduction

The objective of this paper is to provide a summary that highlights important topics and key points pertaining to grasslands that were presented in the 2021 Joint IGC and IRC. Out of the 7 keynote presentations, 173 oral presentations, and 219 poster presentations, a definition of what constitutes a grassland compared to a rangeland would be needed. Using the broad differentiation between grassland and rangeland as cultivated versus native ecosystems (Caradus, 2021), this summary focused on "cultivated grasslands".

Cultivated grasslands are often made up of a small number of plant species, management is normally intensive and the inputs are high, whereas rangelands are complex ecosystems consisting of numerous plant species, management is extensive,

and there are limited inputs. With this definition in place, the focus for this summary centered on the plenary address by Jank, *et al.* (2021), and the keynote addresses by Caradus (2021), and Smith (2021) as well as highlights of talks from Sub-theme 2: Forage Production and Utilization and Sub-theme 3: Livestock Production Systems.

### Cultivated Grasslands: Plenary and Keynote Addresses

Looking back at the 10<sup>th</sup> IGC in Helsinki, Finland (1966), Finland's Minister of Agriculture emphasized "Grassland research in Finland should be intensified with the objective of increasing yields per hectare, as well as improving the quality and efficiency of utilization" (Allen, *et al.*, 2021). This prevailing attitude of the time

was probably bolstered by the commonality that most of the attendees had first-hand experiences of how World War II devastated the food supplies across the globe. There were also predictions by Paul Ehrlich and others, promoted extensively by the press, of looming worldwide famine due to human over-population. That mindset led to the Green Revolution, and an emphasis on high yields and the use of fertilizers that likewise put a heavy importance on maximizing production of cultivated grasslands.

Fast-forward 55 years to the current 2021 Joint IGC-IRC in Kenya where the plenary address by Jank (2021) defined new standards for cultivated grasslands. Similar to the standards defined at the Helsinki congress, there remains an emphasis on pasture productivity, quality, and persistence, but now an added emphasis on carbon sequestration, pasture resilience, adaptation, and greenhouse gas mitigation. Also, novel compared to the Helsinki congress was how pasture sustainability will contribute to positive social, environmental, and economic impacts. Thus, there has been a notable shift from a singular focus on maximizing pasture productivity to now include sustainability of cultivated grasslands and how this fits into the global ecosystem.

In his keynote address, Caradus (2021) went further and defined challenges for the new standards within cultivated grasslands. With the new emphasis on enhanced environmental consciousness, caution is warranted. The integration of large numbers of agritech developments into current pastoral systems may have unintended consequences that negatively impact sustainability of grasslands. This will challenge farmers and society as whole.

In his keynote address on livestock production, Smith (2021) encouraged the engagement of critics on the facts surrounding livestock impacts on greenhouse gas production as well as sustainability. To meet sustainability goals and continue to reduce greenhouse gas emissions, production on a per animal basis must be increased.

### **Cultivated Grasslands: Sub-Theme 2: Forage Production and Utilization Highlights**

There were 40 oral presentations and 81 posters presented in 11 topic areas for this sub-theme. Across these topical areas was the consensus that production is still a key goal although achieving sustainability within production systems was an ever-present theme throughout most of the presentations. A few noteworthy highlights were found for a selected number of the topics.

For the topic Grass Research in Kenya and Other African Countries, it was shown that starting in Brazil in the 1950s, the two grass genera (*Urochloa* and *Brachiaria*) have continued to expand their use and importance throughout the tropics. There was excellent research presented from Kenyan scientists on agronomic studies to determine growth, production, and utilization in Africa, as well as evaluating new cultivars. There still seems to be confusion over taxonomy differences between the two genera that needs to be resolved.

For the topic Tropics and Tropical Genetic Resources, several talks reemphasized the importance of tropical agriculture and especially the conservation and stewardship of its genetic resources. More collections are needed, and accessions identified and curated. Gene banks need to be better funded and resourced.

For the topic Forage Breeding and Genetics, reviews were presented around temperate/tropical breeding successes. There was also a continued emphasis from past IGC conferences on implementing modern forage improvement methods, including biotechnologies, but not at the level of recent previous IGC conferences. However, this is to be expected with the Congress's emphasis on tropical species where applications (and costs) for biotechnologies are still to be determined.

For the topic Forage Legumes for the Tropics, the greatest challenge is to increase the adoption and use of forage legumes especially tropical legumes. Research on grass-legume mixtures found that they are still the best way to increase fodder nutritive quality and reduce N fertilizer use but were also reported to achieve positive greenhouse gas balances.

### **Cultivated Grasslands: Sub-Theme 3: Livestock Production Systems Highlights**

There were 27 oral presentations and 29 posters presented in 7 topic areas for this sub-theme. One issue that emerged was around the topic of management intensive grazing where there is not a global one size fits all scenario. Short-term high-performance pastures are a great example of pushing animal production on pasture to their genetic limit while taking advantage of environmental opportunities. As climate patterns continue to produce larger weather extremes, methods to take maximum advantage of environmental opportunities must continue to be explored. In addition to weather, identification

of stakeholder socio-economic hurdles that limit pasture-based livestock production in economically challenged regions of the world must continue. Advances here will permit producers to not only feed their family, but make a profit as well as contributions to feeding the global population.

Another important topic in several presentations was balancing production and sustainability where short-term gains result in long-term losses if maximal productivity is favored over sustainability. Rest-grazing systems were also reported to achieve greater productivity in the long-term compared to continuous grazing. As intensification continues, one must not be tempted by short-term gains. Producers must continue to explore opportunities to bring grazing animals back to pasture, such as in intensive dairy operations where meat production on pasture could be optimized alongside production of dairy products.

Under a topic that could be labelled as drought, desertification, and degradation, there has been an unfortunate narrative change over time. The narrative evolved from an example of short-term gains in livestock productivity favored over long-term sustainability of the grassland through overgrazing and overuse contributing to degradation and desertification of pastures to a narrative where grasslands were an environmental solution as an ideal use of land in increasingly harsh climates. Now grasslands used for livestock production are again being criticized as a greenhouse gas source problem. This needs to

change through educating policy decision makers and the general public that the coexistence of grassland and livestock management is still a solution to land degradation. Implementing drought-risk financing to build resilience was a very good suggestion.

## **Conclusion**

Future considerations for the IGC include improving research and out-reach programs for the tropics as well as how cultivated grassland can adapt to the current climate change narrative, especially the projected higher temperatures and inconsistent rainfall. Grassland scientists must also fit the sustainability narrative to the science and not the other way around, and scientists must not forget the pastoralists and how they can capitalize on possible future economic opportunities such as carbon sequestration. All grassland scientists must continue to do good science, communicate findings to peers and decision makers, and steer the current sustainability narrative in the right direction, possibly even into the schools.

## **Acknowledgement**

The Kenyan organizers are to be congratulated for being the first to host an International Grassland Congress on the African Continent in the 94-year history of the Congress (Allen *et al.*, 2021). That it was held virtually and during a global pandemic with few interruptions was a technological triumph and a model for others to follow.

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