Forage sorghum hybrid hailed as a landmark cultivar in India

A new sorghum hybrid developed using ICRISAT breeding material was recently given special recognition as the Outstanding Forage Hybrid 2019 for revolutionizing forage sorghum production in India.

This is significant considering that currently, India – the world’s leading milk-producing country – has a major deficit of 35% for green fodder. Known for its excellent yield and quality traits, the sorghum hybrid CSH 24 MF is not only widely adopted by farmers across the country, but also used as the national check – the gold standard against which other cultivars are tested – in national-level tests for other forage sorghum hybrids. As of today, it occupies almost a third of the total area under forage sorghum in the country.

Up to 70% of milk production costs are livestock feed. Therefore, it is critical to develop economical yet nutritious sources of feed. Dual-purpose or fodder crops are among the least expensive sources of nutrients for livestock. However, against the annual forage requirement of 1325.7 million tons (816.8 and 508.9 million tons of green and dry fodder respectively) to support existing livestock population, the total annual forage production is 978.7 million tons (525.5 and 453.2 million tons green and dry fodder respectively). Currently, there is a net deficit of 35.6% for green fodder, 10.95% for dry crop residues and 44% for concentrate feed ingredients.

The ‘multi-cut’ (affording several cuttings over its lifetime) forage hybrid CSH 24 MF was developed by GB Pant University of Agriculture & Technology (GBPUA&T), Pantnagar, Uttarakhand, India, using its Pant Chari-6 as the male parent, and ICRISAT-bred ICSA 467 as the female parent. It was identified and released in 2009, and after extensive testing across the country, the hybrid has steadily gained popularity among farmers across the nation.

Moreover, it is used as the national check in All India Coordinated Sorghum Improvement Project (AICSIP) tests for pre-release evaluation of all new forage sorghum hybrids. Recently, the hybrid was given ‘Special Memento presented in recognition of development of the hybrid. Continued on page 4...
Landmark private-public partnership forged to transform Nigeria’s agricultural sector

Bringing together public and private organizations working in agriculture, Nigeria recently formed a country-level committee with ICRISAT as its co-chair. The committee will use a business development platform called agCelerant to orchestrate financial and technical support for 15 million farmers.

“We need to start reversing this trend (low agriculture productivity) by harnessing the huge potential in the agricultural sector for sustainable development through partnership and engagement with willing stakeholders, who genuinely believe in our beloved nation, and are ready to lend us helping hands,” said Alhaji Mohammed Sabo Nanono, Nigeria’s Federal Minister for Agriculture and Rural Development (FMARD), at the committee’s inauguration.

The National agCelerant Technical Committee espouses a ‘phygital’ approach to farming. The physical and digital together constitute the phygital approach, forming the conceptual bedrock of agCelerant, which was developed by Manobi Africa PLC. The platform connects smallholders with sources of credit and insurance, inputs, and output markets. It uses Internet of Things (IoT), Earth Observation and Artificial Intelligence, and is powered by youth franchisees that can proximally and economically monitor and advise farmers under contract.

agCelerant was developed with technical support from ICRISAT’s Innovation Systems for the Drylands and WCA Research Programs, CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and the European Union’s Horizon 2020 research and innovation program. It provides agricultural investment risk mapping to reduce lenders’ cash-out and increase availability of credit to smallholders. It also offers robust and affordable insurance contracts to reduce persistent climate risk in intensifying crop-livestock systems, as well as improved management of crop-nutrient deficiencies to increase fertilizer use efficiency and agricultural productivity.

In 2018, ICRISAT and Manobi Africa led the early implementation of agCelerant in Nigeria by applying it to the digitalization of nearly 5,000 ha of smallholder sorghum fields in Bauchi, Kano and Niger states. Unprecedented amounts of socio-economic, agronomic and yield data thus collected helped showcase the potential of agCelerant in Nigeria, which led federal authorities to extend its implementation to 15 million smallholder farmers. With US$ 500/ha needed to cover smallholder production costs, agCelerant thus targets a consolidated investment of US$ 7.5 billion by financial institutions. Accordingly, FMARD and Manobi Africa aim to secure the recovery of 1 million smallholder loans within the first year of extended implementation.

As the lead agricultural research institution in the committee, ICRISAT’s role will be to advise in the development of new technical solutions such as advanced yield forecasting, post-harvest loss predictions or hybrid insurance products, and to support deployment targeting and leveraging of other scientific knowledge for purposes like structuring of agCelerant digital seed value chains.

Other members of the committee include Permanent Secretary Office of FMARD (Chair), the Federal Departments of Agricultural Extension and Agriculture, FMARD’s Planning of Policy Coordination and Program Coordinating Unit, the National Agricultural Extension Research and Liaison Services, the Bank of Agriculture, the Nigeria Agricultural Insurance Corporation, the Nigeria Incentive-based Risk Sharing system for Agricultural Lending, the Central Bank of Nigeria, the Economic Recovery and Growth Plan Implementation Unit and Manobi Africa.

A demonstration of the agCelerant platform in progress.
For the first time, the Central Varietal Release Committee (CVRC) of India has released two new machine-harvestable chickpea varieties. With this, the number of machine-harvestable chickpea varieties in India goes up to four. Phule Vikram (ICCV 08108) and BG 3062 (ICCV 08112) were recently identified for release in the Central Zone (Maharashtra, Madhya Pradesh and Gujarat states) of India, during the Annual Group Meet of the All India Coordinated Research Project (AICRP) on Chickpea.

Phule Vikram was earlier released by the State Variety Release Committee (SVRC) of Maharashtra, along with RVG 204 (ICCV 08102), which was released in Madhya Pradesh (https://www.icrisat.org/two-new-machine-harvestable-chickpea-varieties-released-in-india/) in 2017. Prior to that, NBeG 47 (ICCV 05106) had been released in Andhra Pradesh 2016 (http://www.icrisat.org/newsroom/latest-news/happenings/happenings1713.htm#1).

Traditionally, chickpea cultivars have a short and bushy architecture which makes machine harvesting difficult and causes significant yield losses. In addition, with increasing labor wages and a shrinking labor pool, many farmers have been demanding varieties that can be harvested by machine. The recently concluded project ‘Developing Chickpea Cultivars Suited to Mechanical Harvesting and Tolerant to Herbicides’ by ICAR and ICRISAT, and funded by the National Food Security Mission (NFSM) of the Government of India, supported the generation of diverse breeding material for developing machine-harvestable varieties. Apart from the released machine harvestable chickpea varieties, several more are in advanced stages of testing.

Phule Vikram has an erect growth habit with pod initiation from 25 cm above ground level. It is resistant to the commonly occurring disease Fusarium wilt, and recorded 2.27 t/ha average yield on farmers’ fields. The variety was released from Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri.

BG 3062, also having erect growth habit, showed resistance to Fusarium wilt (at more than 24 locations) and stunting, and moderate resistance to dry root rot diseases. The mean weighted seed yield of 2.27 t/ha was observed over a period of three years (2016-17 to 2018-19). This was released by a team of scientists from ICAR-Indian Institute of Agriculture Research (IARI), New Delhi.

The Central Zone has the largest chickpea area in India occupying more than 55% of the total chickpea-producing area. The recent varieties will help millions of farmers move towards mechanization, thus saving cost and time, and reducing drudgery for women who are most often engaged in the harvesting of the crop. Using a combine harvester, one hectare of chickpea crop can be harvested in about 70 minutes. The produce reaches farmers’ homes the same day or can be directly transported to the market.

During the three-day meeting-cum-workshop of the AICRP on Chickpea, during 27-29 August at Ranchi in India, progress on the performance of chickpea genotypes were assessed under various all-India coordinated trials. Over 70 breeding lines/selections from breeding populations supplied by ICRISAT were under different stages of testing, of which 49 promising genotypes were nominated for initial varietal trials (IVTs) by various breeding programs, while the rest were promoted to advanced yield trails (AVTs) for testing during 2019-20.

For more on chickpea, go to: http://exploreit.icrisat.org/profile/Chickpea/232

This work contributes to UN Sustainable Development Goals

Project: Developing Chickpea Cultivars Suited to Mechanical Harvesting and Tolerant to Herbicides
Partners: ICAR-Indian Institute of Pulses Research (IIPR), Kanpur; ICAR-Indian Agricultural Research Institute (IARI), New Delhi; Punjab Agricultural University (PAU), Ludhiana; Rajmata Vijayaraje Scindia Krishi Vishwavidyalaya (RVSKVV), Gwalior; Mahatma Phule Krishi Vidyapeeth (MPKV), Rahuri (not a partner in the project, but involved in evaluation); Acharya NG Ranga Agricultural University (ANGRAU), Hyderabad; University of Agricultural Sciences (UAS), Dharwad; and ICRISAT

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Dr Robert Zougmoré presented with Derek Tribe Award

Dr Robert Zougmoré, Principal Scientist, West and Central Africa, ICRISAT, and Africa Program Leader, CCAFS, received the esteemed Derek Tribe Award by The Crawford Fund at Brisbane, Australia, on 5 September 2019. This was in recognition of his work towards strengthening resilience to climate change in sub-Saharan Africa. Dr Zougmoré has distinguished himself in the field of climate information services, agricultural practices and technologies, and policies and institutions for smart agriculture.

The Derek Tribe Award was launched in 2001 to reward exceptional contributions in the field of international agricultural research.

Dr Rajeev K Varshney honored with two prestigious awards

Dr Rajeev K Varshney, Research Program Director- Genetic Gains, ICRISAT, received two prestigious honors recently.

He was inducted as a Fellow of the Indian Society of Pulses Research and Development (ISPRD) for his contributions towards advancing pulses research. The felicitation was held during the Annual Meeting of All India Coordinated Research Project on Chickpea at Birsa Agricultural University (BAU), Ranchi on 27 August 2019.

Dr Varshney also received the Professor Jayashankar Telangana State Agricultural University (PJTSAU) Life Time Achievement Award - 2019 on 3 September 2019 for his exemplary contributions towards scientific research, teaching and capacity building, specifically for Telangana. While delivering the invited guest lecture on “Global Agricultural Innovations to Feed 1.7 billion in India”, on the 5th Foundation Day celebration of PJTSAU, Dr Varshney emphasized on the urgent need to utilize faster breeding technologies and adoption of global innovations in agriculture.

From page 1... Forage sorghum hybrid...

Recognition’ as landmark cultivar for its excellent yield, quality and adaptability, which has led to its wide acceptance by sorghum farmers in India.

As the contributor of the vital female parent, ICRISAT has played a key role in this partnership – one of the most successful examples of collaborative research for development in CGIAR.

The demand for this hybrid is so high that the ICAR – Indian Institute of Millets Research grants licences to 10-12 seed companies each year to produce the seeds; part of the licence fee is shared with ICRISAT due to its contribution of the female parent.

This work is done as part of CRP on Grain Legumes and Dryland Cereals (GLDC).

For more on ICRISAT’s work on sorghum, go to http://exploreit.icrisat.org/profile/Sorghum/193
New Publications

Linking crop and livestock diversification to household nutrition: Evidence from Guruve and Mt Darwin districts, Zimbabwe
Authors: Murendo C, Gwara S, Mazvimavi K and Arensen JS
Published: 2019, World Development Perspectives (TSI), 14 (100104). pp. 1-4. ISSN 24522929
http://oar.icrisat.org/11198/

Role and regulation of osmolytes and ABA interaction in salt and drought stress tolerance
http://oar.icrisat.org/11199/

Heat Shock Proteins (HSPs) mediated signalling pathways during abiotic stress conditions
Authors: Divya K, Bhatnagar-Mathur P, Sharma KK and Reddy PS
http://oar.icrisat.org/11200/

The social and environmental value of CSR investments in agriculture including the approach and value of science backed solutions
Authors: Kane-Potaka J, Wani SP and Pillai LR
Published: 2018, In: Workshop on CSR for Agricultural Development, November 19-20, 2018, National Institute of Agricultural Extension Management (MANAGE), Hyderabad.
http://oar.icrisat.org/11201/

Sri Lankan finger millet (Eleusine coracana) variety ‘raavana’ as potential probiotic source
Authors: Divisekera DMWD, Samarasekera JKRR, Goonerathne J, Hettiarachchi C and Gopalakrishnan S
Published: 2019, In: Evolving Industrial Biotechnology in Developing Countries. Indian Books and Periodicals, pp. 167-183. ISBN 9789388982016
http://oar.icrisat.org/11202/

Groundnut (Arachis hypogaea L.) improvement in sub-Saharan Africa: a review
Authors: Abady S, Shimelis H, Janila P and Mashilo J
Published: 2019, Acta Agriculturae Scandinavica, Section B — Soil & Plant Science (TSI), 69 (6). pp. 528-545. ISSN 0906-4710
http://oar.icrisat.org/11203/

Quantifying soil carbon stocks and humification through spectroscopic methods: A scoping assessment in EMBU-Kenya
Authors: Segnini A, Posadas A, Lopes da Silva WT, Milori DMBP, Gavilan C, Claessens L and Quiroz R
Published: 2019, Journal of Environmental Management (TSI), 234. pp. 476-483. ISSN 03014797
http://oar.icrisat.org/11204/

Developing value chains to farming as business with technology and innovations in Kenya
Published: 2019, In: The Accelerated Value Chain Development program National conference report, April 26–27, 2018
http://oar.icrisat.org/11206/

Contributions of biodiversity to the sustainable intensification of food production – Thematic study for The State of the World’s Biodiversity for Food and Agriculture
http://oar.icrisat.org/11207/

Best choices for enhancing groundnut productivity in Nigeria
Authors: Vabi MB, Mohammed SG, Echekwu CA, Mukhtar AA, Ahmed B, Ajeigbe HA and Eche CO
Published: 2019, Best Choices for Enhancing Groundnut Productivity in Nigeria. Technical Report. ICRISAT.
http://oar.icrisat.org/11208/

If you would like your recent publication to be included in Happenings (or in the OAR), please write to Ramesh Kotnana, Librarian, at K.Ramesh@cgiar.org
Upcoming events

International Hands-on Training on Genome Editing Techniques
14–25 October 2019, ICRISAT, Hyderabad, India

This introductory 10-day comprehensive training program is ideal for researchers who are looking for a balanced theoretical vs hands-on introduction to gene editing.

For more details, contact Dr Pooja Bhatnagar-Mathur
Course coordinator, E-mail: p.bhatnagar@cgiar.org with copy to Dr Kiran K Sharma, E-mail: k.sharma@cgiar.org and Dr Rishi Kumar Tyagi, E-mail: rishi.tyagi@apaari.org.

CGIAR Big Data in Agriculture Convention 2019
16–18 October 2019, ICRISAT, Hyderabad, India

The CGIAR Platform for Big Data is organizing a convention that examines the role of big data to promote trust in institutions, communities and technologies. Over 500 members of the scientific community and digital agriculture practitioners are expected to attend the sessions.

The convention is being hosted by ICRISAT this year. This is an exciting opportunity for ICRISAT staff to experience the prospects of data in agriculture and related domains. To register, please e-mail: K.Srivalli@cgiar.org by 1 Oct 2019.

For more information, go to: https://bigdata.cgiar.org/hyderabad-2019/

XIX International Plant Protection Congress | IPPC2019
10 - 14 Nov 2019, Hyderabad, Telangana, India

The XIX International Plant Protection Congress – IPPC2019 – has the theme ‘Crop Protection to Outsmart Climate Change for Food Security & Environmental Conservation.’ IPPC2019 will provide a great opportunity to present, discuss and disseminate recent advances in crop protection, and establish contact and collaboration between crop protection scientists from different parts of the world.

For more information, go to: https://www.icrisat.org/event/xix-international-plant-protection-congress-ippc-2019/

ICRISAT @ Workplace

Last week Dr Malick Ba, Country Representative, Niger posted on Workplace:

“Visiting EMBRAPA research center at Sete Lagoas, Minas Gerais State, Brazil to get some insights on their biological control program for fall armyworm. We also discussed collaborative opportunities.”