DIVSEEK INTERNATIONAL NETWORK INC.

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**FOR IMMEDIATE RELEASE** **October 07, 2020**

**DivSeek International launches 11 global 'Hubs' to accelerate the use of natural genetic diversity to advance crop improvement**

SASKATOON, SK – The DivSeek International Network Inc. (DivSeek International), a global, community-driven organization that facilitates the generation, integration and sharing of information related to plant genetic resources, thereby empowering genebank managers, researchers, breeders, and farmers to more effectively utilize genetic variation for research, accelerated crop improvement, and sustainable production, has launched 11 Hub Pilots in North America, Australasia, India, Africa and Europe. Led by teams of independent researchers, the Pilot phase will be a minimum of one year and will provide a framework to identify opportunities for formalization of inter-regional collaborations, leveraging of regional capacity and supporting the training needs of young researchers.

Activities in the Hub Pilots include:

- Facilitating connections between culinary experts, anthropologists, sociologists, ecologists, database engineers, genomic and phenomics experts to expand the characterization of crop diversity to include flavor, culinary uses, and traditional agricultural practices.
- Identifying common practices for the characterization of emerging crops, recently domesticated and novel crops, locally adapted germplasm and regionally important crops, including African staple food crops.
- Providing evidence-based perspectives for sharing information about plant genetic resources, the technological requirements for data-sharing across constituencies, and non-monetary benefit sharing practices of researchers that align with international treaties.

- Deploying advanced analytics including Artificial Intelligence (AI) and Machine Learning (ML) to develop efficient crop diversity exploration strategies and identify gaps in germplasm collections.
- Using chickpeas and durum wheat as case studies for the pragmatic management of plant genetic resources and dissemination of genetic knowledge.

The complete list of Hub Pilots including participating institutions is provided in **Appendix 1**.

"Hubs are a key strategy for connecting independently funded researchers around the world with DivSeek International and its Working Groups," said Chair of DivSeek International's Board of Directors Susan McCouch. She continued, "This series of pilot programs is a critical first step in identifying how DivSeek International Hubs could provide a collaborative umbrella for the sharing of protocols and best practices for the plant genetic resource community. By encouraging engagement at the regional and thematic level, we can better identify opportunities to advance the use of plant genetic resources to improve crops and enhance food and nutritional security."

DivSeek International's operations are funded by Genome Canada, Genome Prairie and the Global Institute for Food Security (GIFS) at the University of Saskatchewan. The organization currently has 67 member institutions representing 28 countries and has established a Secretariat in Saskatoon hosted by GIFS.

*Genome Prairie, one of six regional Genome Canada centres, is a non-profit organization with offices in Saskatoon and Winnipeg that develops and manages genomics and related bioscience research projects, addressing key regional priorities including agriculture, human health, the environment, energy and mining. These efforts play a central role in building the Prairie region's reputation as a location of choice for innovation and commercialization. https://www.genomeprairie.ca/*

*Founded in 2012 in a partnership between Nutrien, the Government of Saskatchewan and the University of Saskatchewan (USask), the Global Institute for Food Security (GIFS) works with a diverse*

*range of partners to discover, develop and deliver innovative solutions for the production of globally sustainable food.*

*https://www.gifs.ca/*

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Appendix 1- DivSeek International Hub Pilots

| Hub Pilot Name | Lead(s)* | Precis |
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| *Germinate Hub* | **Paul Shaw**; Sebastian Raubach; Glenn Bryan; Joanne Russell and Robbie Waugh. The James Hutton Institute | Extend and promote 'Germinate Hub' as a common and scalable data infrastructure platform and community focal point suited to a wide range of users who are primarily studying collections of germplasm of different sizes and complexities. |
| *Genebank Genomics: Unlocking the potential of plant germplasm collections for future agriculture* | **Anthony Hall**, Earlham Institute | Form a collaborative hub of national and international scientists to develop an end-to-end strategy to efficiently explore, capture and catalogue the genetic diversity available in gene banks by deploying the correct technologies and analysis to the right accessions within a gene bank collection enabling a broad range of analysis from cost-effective population scale analysis of diversity panels, chromosome level reference genomes of single individual representatives and using Machine Learning approaches to develop efficient exploration strategies and identify gaps in collections. |
| *A DivSeek hub for Latin America* | Mónica Carvajal (Digital Genebank Scientist & Principal Investigator) and **Peter Wenzl** (Leader, Genetic Resources Program), Alliance of Bioversity Intl. and CIAT | Establish a (Spanish and/or English-speaking) Latin American Community of Practice (CoP) on the use of genomic and digital tools to enhance the conservation and use of PGRFA with centers of origin in the region. Provide access to infrastructure (laboratory space, office areas, servers) at the new Future Seeds genebank (a) to work on DivSeek projects in collaboration with other hubs and (b) to coordinate workshops on topics related to 'genebank genomics' and policy aspects surrounding the use of DSI. |
| *Australasian DivSeek Hub* | Tony Conner, AgResearch, New Zealand; Rob Coe (CSIRO), Australian Phenomics Facility; Justin Borevitz, Australian National University; **Graham King**, Southern Cross | Development of tools, information management and working practices for characterisation of minor, new and emerging crops, including recently domesticated crops or novel crops from local flora and locally adapted germplasm; and provide insights into implementation of Nagoya Protocol including issues related to local knowledge, advancement of the status of historical collections. |

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| | University and Robert Henry and Brad Sherman, University of Queensland | |
| *Does it taste good?* | **Eric von Wettberg**, University of Vermont | Connect culinary experts, anthropologists, sociologists, and ecologists to the database engineers, genomic and phenomics experts developing and utilizing breeding management and genebank management systems to expand crop diversity characterization passport data to include flavor, culinary uses, and traditional agricultural practices. |
| *Genomic technology to democratize and empower the conservation and use of genetic resources* | Carolina Sansaloni; César Petroli and **Sarah Hearne**, CIMMYT | Foster an international community of practice of peers working in genomic characterization of genetic resources, sharing scientific experience, knowledge of resources and advice on germplasm characterization and use by leveraging the existing platform and partnerships of The Seeds of Discovery (SeeD) – a 10 year old platform focused on the characterization and use of maize and wheat genetic resources for the benefit of farmers, consumers and food processors by facilitating access to infrastructure, tools and capacity building resources. |
| *A DivSeek hub for Canada* | **Steve Visscher**, Global Institute for Food Security | Form a national network to coordinate individual efforts in Canadian research institutions to strengthen characterization and utilization of the plant genetic resources, encourage international collaboration and establish guidelines and evidence for policy makers at international treaties. |

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| *Global-Durum: a global platform for leveraging durum wheat diversity* | **Luigi Cattivelli**; CREA Research Centre for Genomics and Bioinformatics, Italy; Filippo Bassi, ICARDA, Morocco and Roberto Tuberosa, University of Bologna, Italy | Use the ongoing phenotyping and genotype data of the Global Durum Panel (GDP) -a breeding-dedicated collection of 1033 single seed descendent purified accessions, and the Tetraploid Wheat Global Collection (TGC) -an evolutionary collection of 1,856 single seed descent purified accessions, as a case study for the management of genetic resources and dissemination of genetic knowledge by providing the framework for collecting all data that will be made publicly available and through a dedicated website, linked to internationally recognized repositories such as GrainGenes and ENSEMBL-Plants; as well as monitor the use of the two collections. Global-Durum is inter-connected with the activities of the Expert Working Group on Durum Wheat Genomics and Breeding established within Wheat Initiative. |
| *Genomic characterization of African orphan crops* | **Cathrine Ziyomo,** BECA-ILRI Hub, Kenya; Jean-Baka Domelevo Entfellner, ILRI, Kenya; Tadessa Daba, Agricultural Biotechnology Research, Ethiopia; Godfrey Asea, National Crops Resources Research Institute, Uganda | Using workshops and training opportunities focused on bioinformatics and crop genetics, connect African leaders and scientists by building genomic databases for different crops that are important to African's food security; strengthening African National Agricultural Research Centre (NAR) capacity to deploy crop diversity and provide access to modern bioscience technology. |
| *DivSeek Hub West Africa* | **Michael Abberton**, International Institute of Tropical Agriculture (IITA); Nigeria and Marie-Noelle Ndjiondjop, Africa Rice, Cote d'Ivoire | Bring together researchers in West Africa with a focus on the genetic diversity analysis for pre breeding and genebank management to develop a strong network for sharing of guidelines, standards and best practices for diversity analyses and data management through a focus on key staple crops of sub-Saharan Africa including rice, maize, cassava, cowpea, yams, soybean and banana/plantain. |

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| *HapCat and PanGenome Hub* | **Rajeev K Varshney**, ICRISAT, India; Dave Edwards, The University of Western Australia, Australia and Kuldeep Singh, ICAR- National Bureau of Plant Genetic Resources, India | Using chickpea as the case species, the proposed Hub will develop and refine tools for haplotypes catalogue (HapCat) and pangenome (PanGenome) analysis to provide a common and scalable data analysis platform and community focal point for researchers primarily generating sequencing data with an aim to utilize genetic diversity in crop improvement programs. |
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