

## BecA-ILRI Hub/SFSA/U Bern/JIC TILLING Workshop:

### *Tapping natural and induced genetic diversity for African crop improvement*

The Biosciences eastern and central Africa – International Livestock Research Institute (BecA-ILRI) Hub will host a practical workshop on TILLING presented by leading crop genetics researchers. TILLING (Targeting Induced Local Lesions IN Genomes) allows directed identification of mutations in a specific gene by combining standard mutagenesis with a sensitive DNA screening technique. The BecA-ILRI Hub has a LICOR machine available for use in research that benefits African agriculture; the course will also cover agarose gel-based methodology for TILLING without specialized equipment.

This workshop is supported by the Syngenta Foundation for Sustainable Agriculture (SFSA) as part of its continuing support to the Hub. We gratefully acknowledge SFSA's commitment to Africa's agricultural development through partnerships with the scientific community.

Places at the workshop are limited and by invitation only.

#### **Dates**

Monday 4 October – Friday 8 October, 2010

Participants outside Nairobi should arrive on Sunday 3 October and depart Saturday 9 October.

#### **Cost**

Further information will be provided to you about travel arrangements and whether you qualify for financial support from the Hub.

#### **Location**

BecA-ILRI Hub, Nairobi, Kenya.

Places in this small workshop are limited to ensure appropriate attention to each trainee; participants must be invited directly or nominated at the invitation of their institution. **Please confirm** whether you are able to attend the workshop by email to: Jagger Harvey [j.harvey@cgiar.org](mailto:j.harvey@cgiar.org) by **Thursday 26 August, 2010**.

## Presenters & organisers

**Dr Zerihun Tadele**, leader of the Tef Biotechnology Project, is based at the Institute of Plant Sciences in the University of Bern, Switzerland. Tef is an understudied cereal crop mainly grown in Ethiopia. Although the crop has many desirable traits, yield is extremely low. To improve the productivity of tef, the project uses TILLING to obtain semi-dwarf tef (*Eragrostis tef*) lines that are less susceptible to lodging but responsive to fertilizer application.

**Dr Korinna Esfeld** is a researcher working with Dr Tadele at the Institute of Plant Sciences in the University of Bern, Switzerland. She is a TILLING expert.

**Dr Cristobal Uauy** is a Project Leader, Crop Genetics, at the John Innes Centre, UK and Visiting Research Fellow, National Institute of Agricultural Botany (NIAB), UK. He has developed TILLING populations in tetraploid and hexaploid wheat, together with alternative screening methods, with Jorge Dubcovsky and Luca Comai at the University of California, Davis (UC Davis). He is currently fine mapping QTL and genes related to yield and quality traits in hexaploid bread wheat.

**Dr Jagger Harvey** is a molecular biologist with particular interest in plant genetics and molecular plant-microbe interactions. He works as a Research Scientist at the BecA-ILRI Hub, helping to coordinate Hub crop improvement research, capacity-building and research support activities. He holds a PhD in genetics from UC Davis.

**Bramwel Waswa Wanjala** is the Capacity Building Research Technician – Crops at the BecA-ILRI Hub. Mr Wanjala assists in crop research and capacity building activities at the Hub and has a range of molecular and tissue culture skills.

## Workshop outline

TILLING is a flexible reverse genetics approach that generates a lasting resource which can be used to screen multiple targets. TILLING comprises two components: (i) a plant germplasm collection containing sequence variation throughout the genome, usually generated by chemical mutagenesis but potentially also utilizing natural variation and (ii) a platform for identifying single nucleotide differences between target sequences. A TILLING screen starts with PCR amplification of a target region from pooled DNA of mutagenized plants and this is followed by mismatch-detection to identify mutant individuals. Alleles generated by TILLING can be readily used in traditional breeding programs since the technology is non-transgenic and the mutations are stably inherited. This workshop will address in detail the theoretical and technical aspects of TILLING, including all the necessary lab work, enabling participants to implement these protocols in their own teams.

Lectures include:

- Applications of different improvement techniques in crops (special focus on Africa)
- High-throughput techniques: Delete-gene, TILLING
- Detailed procedure of TILLING
- Application of LICOR for AFLP and SSR genotyping
- Modified TILLING techniques
- Eco-TILLING (detection of natural variation)

**Biosciences eastern and central Africa – International Livestock Research Institute (BecA-ILRI)**

**Hub** is a joint venture of regional research partners linked to the global research community, with the aim to employ modern biotechnology to improve agriculture in eastern and central Africa. BecA's mission is to improve the livelihoods of resource-poor people in Africa, through the development and use of new technologies and strategies for sustaining agricultural production, improving human health, and conserving the environment. The BecA-ILRI Hub is a shared platform for the region that is hosted on the ILRI campus in Nairobi, Kenya. Scientists and students from eastern and central Africa, and beyond, conduct research and receive training at the Hub in a broad range of biosciences and biotechnology areas related to agricultural improvement. BecA-ILRI Hub: <http://hub.africabiosciences.org/>

**The International Livestock Research Institute** works at the crossroads of livestock and poverty, bringing high-quality science and capacity building to bear on poverty reduction and sustainable development. ILRI works in Africa, South and Southeast Asia, and China. ILRI: <http://www.ilri.org/>

The **Syngenta Foundation for Sustainable Agriculture** is a foundation under Swiss law. SFSA supports partners who work in agricultural and rural development. SFSA's mission is to create value for resource-poor small farmers in developing countries through innovation in sustainable agriculture and the activation of value chains. SFSA has contributed to the development of the BecA-ILRI Hub initiative since 2004 through invaluable technical and financial support. As part of this financial support, SFSA is sponsoring this TILLING workshop. SFSA: <http://www.syngentafoundation.org>