

# NOW AVAILABLE:

## CIMMYT's superior second-generation tropically adapted haploid inducers



**D**erivation and use of doubled haploid (DH) lines, compared to conventionally-derived inbred lines, offers several advantages to maize breeding programs. This includes reduced time taken to develop and deploy superior maize varieties, simplified logistics and reduced costs in line development and maintenance. Use of DH lines in conjunction with molecular markers significantly improves genetic gains and breeding efficiency.

Production of DH lines in maize involves *in vivo* induction using maternal haploid inducers, identification of haploids using anthocyanin markers, doubling the chromosomes in haploid seedlings, and production of seed from fertile doubled haploid plants. *In vivo* haploid

induction is achieved by crossing a source population (used as a female parent) from which homozygous DH lines are developed, with a specially developed maize genetic stock called a "haploid inducer" (used as a male parent) with high haploid induction capacity.

### First-generation tropically adapted haploid inducer lines (TAILs)

To enable the public and private sector maize breeding programs in the tropical/subtropical agro-ecologies to adapt DH technology, CIMMYT and the University of Hohenheim (UHo) together developed the first-generation tropically adapted haploid inducer lines

(TAILs). This was accomplished by transferring the maternal haploid induction trait from the temperate haploid inducers developed by UHo. These tropicalized haploid inducers exhibit better agronomic performance than the temperate haploid inducers, and have similar haploid induction rates (5-8%) in tropical conditions. These first-generation haploid inducers were distributed to several public and private sector organizations worldwide under specific Material Transfer Agreements (MTAs). However, there was further scope to derive superior tropically adapted haploid inducers with higher haploid induction rates, better plant vigor, better standability, flowering synchrony with the tropical maize germplasm, and tolerance/resistance to tropical foliar diseases and ear rots.

## CIMMYT second-generation tropically adapted haploid inducers (CIM2GTAILS)

Recognizing the scope to further improve the first-generation TAILS for various traits, CIMMYT initiated the development of second-generation haploid inducers for the tropics by transferring the haploid induction trait from first-generation TAILS to elite CIMMYT maize lines. Selections were made for higher haploid induction rates and superior agronomic performance.

The CIM2GTAILS showed high haploid induction rates (~8-15%) under CIMMYT-tested (sub)tropical

conditions in Mexico and Kenya, besides better agronomic performance in terms of plant vigor, synchrony with tropical source populations, better standability, and resistance to important tropical foliar diseases and ear rots. Haploid inducer hybrids developed using these CIM2GTAILS exhibit greater heterosis for plant vigor and pollen production while maintaining similar haploid induction rates as the parents; these are well-suited for open-pollinations with source populations in isolation nurseries.

CIMMYT will share specific quantity of seed of these CIM2GTAILS and will grant authorization for use of these CIM2GTAILS to interested applicants, after signing the relevant material

transfer agreement (MTA) with specific terms and conditions. The intellectual property of the CIM2GTAILS will remain with CIMMYT.

## Process for receiving CIM2GTAILS

Institutions interested in receiving the CIM2GTAILS from CIMMYT under a relevant MTA may send a letter of intent or an expression of interest to the contact points mentioned below. CIMMYT may seek more information, if required, and will share the relevant MTA template for signing by the applicant institution before sharing the seed and further information regarding the CIM2GTAILS.



For further details, please contact:

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