

## **CYCLOXYDIM-TOLERANT MAIZE – BREEDERS STANDPOINT**

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Cycloxydim-Tolerant Maize (CTM) was developed by researches at the University of Minnesota. CTM plants were regenerated from tissue culture selected for callus growth in the presence of cycloxydim, and the resulting plants were shown to contain a nuclear mutation, expressed as a single, partially dominant gene (known as *Acc1*) that conferred tolerance to the herbicide. Cycloxydim is a systemic herbicide for post emergence application in dicot crops to selectively control grass weeds. Corn, like most grasses is susceptible to cycloxydim due to inhibited acetyl-coenzymeA carboxylase enzyme activity. There are two key benefits of this technology: first, cycloxydim applications in CTM hybrids can be delayed until the weed spectrum and population density exceed agro-economic threshold; second, cycloxydim can be applied at either stage of plant development with no effect on basic agronomic traits, compared to non treated plants. Nevertheless, this type of tolerance requires 2 genes to be fully effective, i.e. gene must be present in both inbred parents to provide complete tolerance in the resulting hybrid. Such type of tolerance doubles the chances for yield drag and doubles the number of inbred conversions needed. This also limits germplasm integration and increases time lag in developing hybrids. Despite these difficulties, many seed companies introduce tolerance to cycloxydim into their commercial inbreds, and many of them have already commercialized CTM hybrids. Finally, it came as a logical question what is more important – hybrid performance or new trait? Critical to the success of this technology has been yield performance of CTM hybrids. At the same time, performance and herbicide tolerance do not exclude each other and can surely co-exist. To be accepted, this coexistence must secure high profitability to corn producers. However, CTM hybrids will not replace conventional ones on a large scale, but could be used as a specific tool, or could enhance the use of alternative weed control options in corn production.