SUMMARY OF BUILT-IN-REFUGE FIELD VALIDATIONS
PRESENTED AT AICCIP MEETING AT PAU, LUDHIANA, 8th April, 2014

Built-in-refuge (BIR) is a proposed new method to plant non-*Bt* refuge. The proposed product of Bollgard II with BIR at 5% level shall consist of 450 grams of Bollgard II hybrid seeds blended with an additional non-*Bt* seeds of the corresponding cotton hybrid as refuge that constitutes to a minimum of 5% of the final blend.

BIR concept was field-evaluated during *Kharif* 2011 and 2012 with the aim to evaluate abundance of major cotton Lepidopteran pests (*H. armigera, S. litura* and *P. gossypiella*) on non-*Bt* plants in a BIR planting design relative to their abundance on 20% non-*Bt* structured refuge. In these two years of testing, Central Institute for Cotton Research-led Institutions evaluated the refuge 'value' of BIR non-*Bt* plants in five field-locations (2012); State Agricultural Universities in five locations (2011 & 2012) and Mahyco Monsanto biotech Ltd., in twenty one field locations (2011 & 2012). The studies demonstrated that key Lepidopteran pests like *H. armigera, S. litura* and *P. gossypiella* were able to colonize non-*Bt* plants (at 5% and 10% levels) in the BIR format (as measured by fruiting body damage), on per plant basis, to similar extent as the bollworm colonization on non-*Bt* plants in the structured refuge format. Data on larval movement was generated by artificial infestation (25-40 second/third instar larvae/plant) of refuge non-*Bt* plants in BIR format in three locations. These studies concluded that adjoining Bollgard II plants did not show increased damage over the Bollgard II controls in 5 out of 6 data sets.

Apart from these research trials, MMB conducted BIR demonstration trials in 233 field locations across India in which the product concept of BIR with Bollgard II was tested during *Kharif* 2013 in ~1.0 acre plots. The difference in seed-cotton yield between plots with 5% BIR and 100% Bollgard II plots was statistical non-significant.