Monitoring of BT cotton Fields in Karnataka

The Govt. of India, Ministry of Environment and Forests has constituted a monitoring committee vide their letter No. 10/1/2002-CS dated 30.9.2002 to review the compliance of terms and conditions imposed by GEAC while according the approval for commercial cultivation of Bt cotton variety by MAHYCO in the State of Karnataka. The following are the monitoring committee members, who participated in the review taken on 11th and 12th of October, 2002.

1. Dr. R.K. Trivedi, Assistant Commissioner, Department of Agriculture and Cooperation, Ministry of Agriculture, Govt. of India, New Delhi
2. Dr. S.C.V. Reddy, Additional Director, Department of Agriculture, Govt. of Karnataka, Bangalore

In Karnataka State as per the data provided to the State Government by M/s Mahyco Monsanto Bio-tech (India) Private Limited 5478 packets of MECH-162 (Bt-cotton) have been sold in the State. The coverage expected with these packets will be 5478 acres cultivated by 4952 number of farmers across the districts of Belgaum, Bellary, Chitradurga, Bijapur, Davanagere, Dharwad, Haveri, Gadag, Gulbarga, Koppal and Raichur. The Committee has inspected the farmers’ fields’ along with officials of M/s Mahyco, selected randomly in the districts of Chitradurga, Haveri, Dharwad and Belgaum. In all 15 plots have been inspected and the details of the plots and the farmer are provided in Annexure – I.

Observations recorded during the inspection are categorized into 3 sub headings.

1. Issues related to compliance of conditions stipulated by GEAC.
2. General observations including farmer’s opinion.
3. Suggestions for improvement.

1. **Issues related to compliance of conditions stipulated by GEAC:**

i. The period of validity of approval is 3 years from April 2002 March 2005:

   Project authorities have accepted and agreed.

ii. Every field where Bt cotton is planted shall be fully surrounded by a belt of land called ‘refuge’ in which the same non-Bt cotton variety shall be sown. The size of the refuge belt should be such as to take at lease five rows of non-Bt cotton or shall be 20% of total sown area whichever is more.

   All the fields inspected have refuge crop of non-Bt variety of MECH 162. Out of 15 fields inspected only 50% of the farmers have observed
sowing of 5 rows of non-Bt variety as refuge. Around 20% have sowed 4 rows, 20% sowed 3 rows and remaining 10% have sowed 2 rows. The area coverage by refuge could not be co-related in view of the fact that the area sown, seed rate, spacing followed wherein among the 14 fields inspected. Some of the farmers have adopted sowing of 2 seeds/hill than 1 seed/hill as suggested. As a result there is a variation in the refuge coverage. Over and above, the exact dimensions of the fields are not available for verification. Farmers were able to provide only the acreage held by them. Hence the compliance with respect to 20% of the total area could not be checked.

iii. To facilitate this, each packet of seeds of the approved varieties should also contain a separate packet of the seeds of the same non-Bt cotton variety which is sufficient for planting in the refuge defined above.

Each packet of 450 gm of Bt variety has a small packet of 120 gm of non-Bt variety separately to enable the farmer to sow the refuge crop.

iv. Each packet should be appropriately labeled indicating the contents and the description of the Bt hybrid including the name of the transgenes, the GEAC approval reference, physical and genetic purity of the seeds. The packet should also contain detailed directions for use including sowing pattern, pest management, suitability of agroclimate-conditions etc. in vernacular language.

The packing of the Bt cotton seeds sold in the market is checked and found to contain details like the name of the transgenes, GEAC approval reference, physical and genetic purity of the seeds, guidelines for sowing pattern and pest management in Kannada (vernacular language).

v. MAHYCO will enter into agreements with their dealers/agents that will specify the requirements from dealers/agents to provide details about the sale of seeds, acreage cultivated and State/regions where Bt cotton is sown.

MAHYCO has entered into an agreement with dealers incorporating the conditions that the dealer will provide details of sale of seeds, farmers purchased, acreage cultivated etc. Dealers are also to submit monthly reports both hard copy as well as in electronic form to the company. The monthly report submitted by a couple of dealers was shown to the committee during the discussions on 31.10.2002.

vi. MAHYCO will prepare annual reports by 31st March each year on other use of Bt. Cotton hybrid varieties by dealers, acreage locality (state and region) and submit the same in electronic form to GEAC if asked for by the GEAC.

Project authorities have agreed to comply.
vi. **MAHYCO will develop plan for Bt. based integrated Pest Management and include this information in the seed packet:**

The packet has a brochure containing the details on pest management, refuge crop requirements etc. including IPM in English as well as in local language. A copy of the information available in the packet is enclosed as Annexure IV.

viii. **MAHYCO will monitor annually the susceptibility of bollworms to Bt gene vis-à-vis baseline susceptibility data and submit data relating to resistance development, if any to GEAC.**

As per the information provided it is understood M/s MAHYCO has an established laboratory at Kalakal and Jhalna for monitoring of baseline susceptibility data required by GEAC. They have agreed to submit the report by the end of the season for the current year. It is also learnt that a baseline susceptibility study of bollworms to CRY 1 Ac gene was inducted in 2000-2001 by Project Directorate for biological control (PDBC), Bangalore and data was already submitted to GEAC in 2001.

ix. **Monitoring of susceptibility of bollworms to the Bt. gene will also be undertaken by an agency identified by the Ministry of Environment and Forests at applicant’s cost.**

It is understood that Central Institute for Cotton Research, Nagpur has informed regarding their willingness to undertake the studies on monitoring for shift in baseline susceptibility (Development of tolerance/resistance) in cotton bollworms against Cry 1 Ac toxin in various cotton growing regions of the country. M/s MAHYCO has confirmed to sponsor the project as per the protocol submitted to them.

x. **MAHYCO will undertake an awareness and education programme, interalia through development and distribution of educational material on Bt. cotton, for farmers, dealers and others:**

As per the data submitted on 31.10.2002 MAHYCO has conducted 56 no. of field days in 8 districts of Karnataka with 4210 participants. In addition, project authorities are also proposing to conduct 70 field days with expected no. of 6380 no. of participants. Awareness programme have been conducted to dealers, company executives, field assistants as well as Agricultural Department Officials in Haveri, Belgaum and Davanagere districts.

xi. **MAHYCO will also continue to undertake studies on possible impacts on non-targets insects and crops and report back to GEAC annually.**

Project authorities have prepared a data recording sheet for recording the data with respect to the non-target insects in these trails. The non-
target pests include sucking pests (aphid, jassid, white fly, mite) bollworms (spotted bollworm, American bollworm, pink bollworm), natural enemies (Chrysopa, lady bird and others). This data is recorded for all the fields by the field assistants during their field visit.

Xii. The label on each packet of seeds, and the instruction manual inside the packet should contain all relevant information:

Refer compliance against the condition IV.

xiii. MAHYCO will deposit 100 g seed each of approved hybrids as well as their parental lines with the National Bureau of Plant Genetic Resources (NBPGR):

Project authorities have reportedly submitted 100 gm seed of 3 hybrids and their respective parent lines to Director, NBPGR, New Delhi on 25.7.2002.

xiv. MAHYCO will develop and deposit with the NBPGR the DNA fingerprints of the approved varieties.

With respect to development and depositing the DNA fingerprints work is reportedly under progress by project authorities and it will be complied by December, 2002.

xv. MAHYCO will also provide to the NBPGR, the testing procedures for identifying transgenic traits in the approved varieties by DNA and protein methods:

The testing procedures for identifying Cry 1 Ac gene by DNA and protein methods has also been submitted to NBPGR on 25.7.2002.

5. As regards the Bt cotton variety Bt MECH g15. this variety has not yet been tested by the ICAR, though the trials conducted by MAHYCO on this variety have been monitored by MEC, it has therefore been decided that ICAR will conduct traits on this variety within their coordinated trials and submit the report to GEAC for consideration. For this purpose, you may kindly supply the required amount of seed to the ICAR well in time for conducting the trials in northern region:

With reference to MECH – 915 (Bt) variety testing is being undertaken by project authorities at 9 locations in ICAR system. These locations are Ludhiana, Abuhar, Faridkot, Hissar, Sirsa, Sriganga Nagar, Hanumangad, Modipuram and Kanpur. Reports will be submitted to GEAC once the trials are completed. It is not clear from this information whether trials are being conducted by ICAR themselves or by project authority as per ICAR system. This needs clarification, it is understood these 9 locations were seen by Dr. Garg, Additional Director, MoEF, RO (NWZ) on 20.9.2002.
2. **General Observations:**

   (A) **Role of State Government:**

   In the approval given by GEAC nothing specific was mentioned about the role of the State Government in implementation and enforcement of the conditions. Govt. of Karnataka have constituted a State level biotechnology coordination committee (SLBCC) as per the Govt. of Karnataka order FEE/190/ENV/98 dated 14.12.1988 as prescribed in the Rule 4 (5) of “Rules for manufacture, use, import, export and storage of hazardous micro organisms, genetically engineered organisms of cells, 1989” notified under E(P) act, 1986. It is to be clarified whether this approval is also reviewed periodically by this committee at the State level. Apart from this a State level monitoring and evaluation committee (SLMEC) has been constituted as directed by Dept. of Bio-technology, Govt. of India for monitoring of large scale field trials of Bt. Cotton during Kharif 2000 vide GOI letter No. Bt/BS/16018/98 PLD dated 12.1.2001 under Chairmanship of Dr. Shekar Shetty. In addition Govt. of Karnataka has also constituted District Level Committee (DLC) under the Rule 4 (6) of “Rules for manufacture, use, import, export and storage of hazardous micro organisms, genetically engineered organisms or cells, 1989” notified under E(P) Act, 1989 vide their order No. FEE/190/ENV/98 dated 145.12.98 and even no. 24.8.2001. It is requested to clarify what should be the role to be played by these committees in monitoring and enforcement of the conditions stipulated in this specific GEAC approval for Bt cotton trails.

   (B) **Farmers Opinion:**

   (a) Some of the farmers have expressed their apprehension that environmental activists in the State might uproot their Bt cotton crop. Hence they have not taken up Bt cotton crop though they are interested due to its high yields. They requested State Government policy on Bt cotton growing in Karnataka State based on which they expressed their desire to go for Bt cotton in next year. Since the cost of the seed is very high they requested Government intervention in reducing the cost of the seed to make it more affordable.

   (b) It is found all the 15 farmers (number of field inspected) cultivating Bt cotton have gone for 2-3 sprays of systemic insecticides for controlling sucking pests. In many cases they have gone for 1-2 sprays of contact insecticide also to control bollworms. This spray of contact pesticide is done more on apprehension mainly as a prophylactic measures rather than on ETL based judgment.

   (C) It is observed during the inspection of the 15 fields as well as other surrounding fields there is a low level of pest incidence generally
during this year in the districts due to the dry conditions prevailing. In view of this it is difficult to conclude anything on the pest management practices adopted at field level during these commercial traits.

3. Suggestions for improvement:

A. The education of the farmers has certainly a role to play in cultivation of Bt cotton specially with reference to refuge management, insecticide spray, and integrated pest management as well as other agricultural practices, as a couple of educated farmers have observed the recommendations of the company given in the pack and field advice meticulously. It is necessary a concerted effort by the company in carrying out extension programs in collaboration with State Dept. of Agriculture and Agricultural Universities in the State would go in long way in managing Bt cotton cultivation economically and environmentally sound manner. Directions in this regard may be given to state govt. and to DBT.

B. It is understood that Central Institute of Cotton research (CICR), Nagpur working under ICAR has developed a kit for detection of Bt cotton plants vis-à-vis non Bt plants. The project authorities as well as State Agriculture Departments at District level should procure this equipment and check the enforcement of compliance requirements with respect to refuge crop management.

C. Though the project authorities fields of interaction with the concerned farmers is good there is no documentation on the various activities carried out by the company in the area of extension and other technical issues raised in GEAC approval. Project authorities should prepare an internal protocol for monitoring and compliance of GEAC conditions effectively by field staff. A copy of that protocol should be submitted to Ministry. Similarly a monitoring protocol including frequency of monitoring may be prepared by GEAC to facilitate monitoring of these traits during this period by State committee and Central committee like this.

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