

## **Preliminary Assessment Report from a Field Visit: Mortality in Sheep Flocks after grazing on Bt Cotton Fields**

**Villages Visited:** Jidikal & Gummadivally; Lingala Ghanapuram [mandal]; District Warangal.

**Shepherds interacted & Sheep flocks examined :** Chilver Kumar & Dandi Ailaiah  
**Date of Visit:** 29th of January 2007 (preliminary visit by CSA personnel on 25th January).

### **Objective:**

To investigate and assess high mortality of sheep reported by shepherds of local area after grazing on Bt Cotton fields.

### **Team Members:**

- Shri Dharmender, Agriculture Scientist, Centre for Sustainable Agriculture, Hyderabad;
- Shri Bhikshapathi, Coordinator, CROPS, Jangaon;
- A practicing Veterinary Doctor.

### **Observations**

Dandi Ailaiah is a shepherd having 100 Nellore sheep and 50 local goats. He grazed his sheep and goat on 7 acre of his own Bt. Cotton (Bt Bunny) field for three consecutive days around the 10th of January. After 3 to 4 days of continuous grazing (around two-three hours a day) on these fields, 25 sheep and 5 goats fell seriously sick. Even after treatment with the help of local veterinarians, 5 sheep and 2 goats died. When they were told that the mortality could be because of the grazing on Bt Cotton fields, he and other shepherds in the village stopped the grazing of their sheep on these fields.

The farmer has applied 2 bags of DAP, one bag of urea and one bag of 20:20 per acre, during June month (2006). No pesticides were sprayed on the crop during this season.

Another shepherd, Chilver Kumar having a flock size of 65 sheep also reported that his animals were affected after grazing on Bt Cotton fields. Out of eight affected sheep, one sheep died. At the time of the visit, we could not find any sick animal and there were no deaths in the flock.

The major clinical symptoms which were noted by shepherds include:

1. Dullness of affected sheep
2. Swelling of eyelids
3. Swelling of ear and face (slightly) also
4. Some times salivation
5. Bloat
6. Nasal discharge with blood tinge

7. Coughing
8. Blackish diarrhoea with foul smell
9. Haemoglobinuria / Red colour urine

The deaths started suddenly after three days after grazing on Bt Cotton fields.

It was mostly young sheep between 1 to 2 years and lambs of 4 to 5 months that were vulnerable and affected. After the treatment of affected sheep, they became weak and required 2 to 3 weeks to get relief from the symptoms.

Both of them Shri Dandi Ailayah and Shri Chilver Kumar conducted post mortem on their own dead sheep and reported the following:

1. Blood dark or coffee brown / blackish in colour
2. Discolouration of ruminal content
3. Black patches in the small and large intestine
4. Both intestines are boiled in appearance and very easily broke into pieces
5. Lungs somewhat blackish, hard and boiled in appearance
6. Liver is also hard and with black patches
7. Spleen slightly enlarged

**Other flocks affected:** Earlier, a visiting team of CSA was shown some sick animals on 23rd January 2007 in Daulatnagar village of Parvatagiri mandal of Warangal district. The shepherds here like Cheemala Kumaraswamy, Doodaiah, Ilaiah, Kandikuntla Komaraiah etc., were also reporting that the animals were affected with a similar set of symptoms upon grazing on Bt Cotton fields. Here also, mortality of goats and sheep was reported.

### **Discussion & Diagnosis**

The symptoms and the post-mortem lesions stated by the shepherds do not correlate to or resemble different diseases that are prevalent/common during this period, which are distinguished by shepherds also.

#### 1. Sheep Pox

The succession of papules, vesicles and pustules appearing on various parts of body, combined with febrile reaction are characteristic symptoms of this contagious disease.

#### 2. Contagious Ecthyma

It is a viral disease affecting primarily the lips and characterized by formation of papules and the pustules and pilling up of the thick scabs. Usual course of disease is 1 to 4 weeks.

#### 3. Peste Des Petits Ruminants [PPR]

The affected sheep show sudden rise of body temperature

Restlessness

Dry coat

Dry muzzle

Muco purulent nasal discharge  
Respiratory distress  
Broncho pneumonia  
Cough  
Non hemolytic diarrhea  
The postmortem lesion is zebra markings in small intestine.  
Mortality is 90 percent

Occasional outbreaks in group of sheep and goat in Warangal district of A.P. is reported by CSA and others since last year. There is poor response to standard treatment and symptoms are insufficient. Hence, laboratory assistance is necessarily required for confirmation of sheep dying most probably with a correlation to grazing on Bt Cotton fields.

### **HYPOTHESES:**

There are two-three possible hypotheses about the phenomenon being witnessed here:

- 1 that the phenomenon is not connected to cotton at all. If it is not connected to cotton at all, but is a new disease or something similar, the departments responsible and institutes involved should show evidence for the same by pointing out what is the new disease, what is causing it, what is its connection with animals grazing on cotton and so on.
- 2 that the phenomenon is connected to Cotton crop in general and not just Bt Cotton. If it is not connected to Bt Cotton but is related to cotton in general, the institutes involved should clearly produce evidence as to why this phenomenon was not seen before the advent of Bt Cotton and should also produce evidence to show how it is linked to non-bt Cotton also.
- 3 that it is because of Bt Cotton there could be plant physiological changes taking place (like nitrate accumulation) which could be a direct result of changed agronomic practices (like more chemical fertilizers being applied to Bt cotton, as farmers are repeatedly reporting) or because of a basic alteration of the bio-chemistry of the Bt cotton plant due to the technology of genetic engineering adopted.
- 4 that it is because of alteration in digestive processes within the animal after ingestion of Bt Cotton due to changed bio-chemistry of the plant, due to changed microbial activity within the animal guts etc.

### **CSA'S DEMANDS**

We demand that the following investigations and activities be taken up immediately by the Genetic Engineering Approval Committee (GEAC in the Ministry of Environment & Forests), Animal Husbandry department [GoAP], the Agriculture department [GoAP], ANGR Agriculture University (Veterinary College as well as other relevant disciplines), Sri Venkateswara Veterinary University, Veterinary Biological Research Institute and the IVRI to pursue this systematically and scientifically.

- 1 Alert the Animal Husbandry department personnel at the ground level in all Bt Cotton growing belts to look out for any unusual morbidity and mortality in sheep and goats and other animals. Confirm through case history whether the symptoms match any known disease during this period of the year and whether vaccinations have been administered to the affected flocks for that disease (in case such vaccination has been administered, the phenomenon should be all the more worrisome). Such cases should be immediately brought to the notice of the JD-AH and Director, AH Department in Hyderabad within 24 hours. (these are cases that are routinely reported by the shepherds themselves but observed with more alertness and care to check for correlation with Bt Cotton)
- 2 Send special teams to fan around the large Bt cotton growing belts with high sheep/goat population too and do a special rapid appraisal on whether any flocks have been affected - check symptoms for any known diseases, vaccination routines and also check for grazing patterns and possible correlation to Bt Cotton. (these are cases where a pro-active appraisal of the situation is launched)
- 3 Collect Bt Cotton samples along the grazing route of the animals during the period that they fell sick as well as soil samples where the Bt Cotton leaf samples are picked up. Also collect blood samples of the affected animals, along with blood samples of unaffected animals which have not been grazed on Bt Cotton.
- 4 With the Bt Cotton samples :
  - analyse for pesticide residues,
  - analyse for nitrates and nitrites and compare against normal levels for cotton in those areas,
  - analyse for cyanide,
  - analyse for gossypol build up.

In each case, the Bt Cotton sample should first be confirmed for its Cry1Ac presence. Samples of non-Bt counterparts sown as refuge should also be collected from the grazing route, checked for presence of Bt endotoxin and analysed for the same above.

Similarly, the soils should be tested for nitrate and nitrite content. A comparative picture of the Bt Cotton samples and non-Bt Cotton samples for the above parameters should be put out.

- 5 With the blood samples :
  - Analyse for any bacterial, fungal or viral diseases
  - Analyse for pesticide residues
  - Analyse for nitrates and nitrites
  - Analyse for cyanide
  - Analyse for anti-bodies related to Bt toxin

A comparative picture of the affected and unaffected animals should be drawn based on such analysis.

- 6 A questionnaire-based survey should be conducted with all shepherds/goatherds whose flocks have been affected by the phenomenon. This survey should be able to understand whether cotton grazing normally has caused such symptoms and problems or is it happening only after the advent of Bt cotton on a large scale, the observations of the shepherds about the symptoms found, the results of the local post-mortem that shepherds themselves tend to do in case an animal is dying or dead and so on.
- 7 We also demand that GEAC, Animal Husbandry Department and Sri Venkateswara Veterinary University should explain what actions they have taken in the last one year when similar complaints were made.

Meanwhile, it is the responsibility of the agriculture and animal husbandry departments to pro-actively put out material alerting farmers and shepherds about the phenomenon and asking them not to graze their animals on cotton fields especially Bt Cotton fields (until a conclusive explanation is provided for what is being experienced and witnessed by farmers/shepherds on the ground, connected to grazing on Bt Cotton), asking them to report the phenomenon immediately to the department etc.