

gossypiella). Pink bollworm attack was found to be severe after 60 to 70 days. There are two possible reasons for this. The first is that the period of expression of the *Bt* endotoxin does not coincide with the time of the bollworm attack. The other explanation is that the pink bollworm is not susceptible to the *Bt* endotoxin.

Morin *et al.*¹ report that field populations of pink bollworm harbour three genetic mutations that confer resistance to *Bt* toxin.

The economics of cultivating *Bt* cotton is clearly not in favour of farmers. The seed is about four times more expensive than the good local hybrids. The difference in the price of seed is approximately Rs 1200 per (450 g) bag, while savings on pesticide averaged only Rs 217 per acre.

The total investment per acre is much higher for *Bt* cotton than for non-*Bt* cotton varieties. The *Bt* cotton farmer had to invest on average, Rs 983 more per acre than his non-*Bt* counterpart.

Net profit from *Bt* cotton was lower per acre compared to non-*Bt* cotton in all types of fields (low to high yielding). In fact, 60% of the farmers cultivating *Bt* cotton were not even able to recover

their investment and incurred losses averaging Rs 79 per acre.

A number of factors have probably contributed to the failure of Mahyco–Monsanto's *Bt* cotton. The first is the poor quality of the varieties. It is known that *MECH* 162 and *MECH* 184, which were transformed to *Bt* 162 and *Bt* 184, are poor to modest performers. A better variety would give a better *Bt* cotton so the GEAC must answer why it approved this *Bt* cotton when better quality *Bt* cotton hybrids belonging to Indian companies were in the pipeline.

Because of the expensive seeds and modest pesticide saving, the economics of the *Bt* crop is not favourable for the farmer. Tilting the balance further is the fact that *Bt* cotton must be grown with a refuge, necessary for resistance management. This is recommended as 20% of the cultivated area by the GEAC. 'Wasting' 20% of the land on managing resistance makes the *Bt* cotton even more nonviable, especially for small farmers.

A further problem appears to be the vulnerability of *Bt* cotton to pink bollworm, which is a significant cotton pest in India. If this is indeed the case as this study demonstrates, then the *Bt* strategy for cotton is likely to fail because if the

Bt endotoxin protects only against the green bollworm and not against the pink bollworm, then farmers will have to continue pesticide sprays.

One of the most shocking revelations of this investigation was the fact that neither state level nor district level committees had been set up in either Maharashtra or Andhra Pradesh where *Bt* cotton was being commercially grown. This is a breach of law and a direct violation of the prescribed rules for the manufacture, use, import, export and storage of hazardous microorganisms and genetically engineered organisms and cells, under the Environment Protection Act, 1989.

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Importance of palliative care services for patients with gall bladder carcinoma

Gall bladder cancer (GBC) is the commonest abdominal malignancy in northern India, with an estimated incidence of 6 per 1,00,000 population¹. GBC is a fatal disease with poor prognosis. Even with the numerous diagnostic tests available, GBC is frequently first diagnosed during laparotomy or laparoscopy procedures, which are expected to confirm the presence of benign gall bladder diseases². Approximately 2% of patients who have operations for gall stones are diagnosed with cancer at the time of surgical exploration. In India, however, the majority of GBCs are found to be at an advanced stage during ultrasonography for upper abdominal symptoms³, making it difficult for initiating any curative treatment. Hence, majority of patients are considered for palliative treatment. We conducted a survey-based study in

which a questionnaire was mailed to 153 patients with GBC (male : 50; female : 103), who had received treatment in our institute. Seventy-two patients or their relatives responded. The details of the study are given in Table 1.

On the basis of our survey we would like to emphasize that majority of Indian patients with GBC require palliative care (PC). Unfortunately, the concept of PC for cancer patients is relatively new to India⁴. The benefits of pain relief, con-

Table 1. Response to questionnaire-based survey

No. of patients to whom questionnaires were mailed	153
Patients residing in urban area	65 (42.5%)
Patients residing in small township/village	88 (57.5%)
No. of patients who received curative treatment in hospital	39 (25.5%)
No. of patients who received palliative treatment in hospital	114 (74.5%)
No. of patients who responded	72 (47.5%)
No. of patients who sent back incomplete questionnaires	8 (11.1%)
After leaving the hospital:	
No. of patients who faced problem of pain management	28 (38.8%)
No. of patients who faced problem of management of jaundice	21 (29.1%)
No. of patients who faced problem of management of ascites	10 (7.2%)
No. of patients who faced problem for nausea and vomiting	12 (16.6%)
No. of patients who went for alternative cancer therapy	15 (20.8%)

CORRESPONDENCE

trol of symptoms and psychosocial support have been recognized since 1960s in the UK and other Western countries⁵. However, even after 17 years since the inception of PC in India, the facilities are still limited in most parts of the country. Many states are without any form of PC facilities and there are only 13 hospices⁶. Many obstacles and reasons seem to be responsible for this poor development: (i) Lack of enough resources; (ii) lack of awareness among professional-curriculum for both medical and nursing does not provide structural teaching or training in PC; (iii) resistance to change—Indian doctors are still reluctant to practice anything other than surgery, radiotherapy and chemotherapy. They feel uneasy about discussing treatments and other measures that are not aimed at cure⁷, and (iv) morphine availability: the countrywide morphine availability is still suboptimal due to stringent regulation to prevent abuse⁸.

GBC is more prevalent in the less-educated people with low socioeconomic status⁹ and it is thus probable that physicians involved in primary care

hospitals are likely to encounter more number of patients with GBC. However, owing to the lack of proper infrastructure in the primary health care clinics, early detection of GBC has always been challenging. In this situation, patients presenting with abnormal liver function test, elevated serum alkaline phosphatase¹⁰ should be considered as suspects for GBC and referred to secondary and tertiary care hospitals for further investigations. We believe that there is an urgent need for a consortium on GBC so as to evolve a consensus for early diagnosis and improving the standards of palliative management of this fatal disease in our country.

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NEWS

The Volvo Environment Prize 2003

The environmental problems of our times are often so complex and multi-faceted that they call for Renaissance thinking, challenging scientists and activists alike to go beyond traditional disciplinary boundaries. The Volvo Environment Prize has been awarded to Madhav Gadgil of the Indian Institute of Science, Bangalore, India and Muhammad Yunus of Bangladesh, each a sterling example of thinking outside the disciplinary box. In doing so, they have created new models for scientifically understanding and transforming the relationships between poverty, development and the environment.

Madhav Gadgil is one the world's leading ecologists and conservationists, a scientist who has done brilliant pioneering work in integrating research on biodiversity with advocacy and activism in linking science to the needs of communities and poor people. The Volvo Prize



Madhav Gadgil

Committee notes that: 'As a scientist he has contributed to fundamental theory, illuminating the life cycle and competitive strategies of living things, taking his examples from dandelions to bamboo to elephants. This work led to the first decision in India to reduce the level of perverse subsidies to forest exploitation, and was the underpinning for the establishment of the country's first biosphere reserve in the Western Ghats. These were outstanding achievements given the clash of interests over land use between dam builders, loggers and forest harvesters, environmentalists and local people.

Motivated by a belief that ecology and equity need not be traded off against each other provided the traditional knowledge of communities can be recognized as central to the project of science, his work has shown that databases of local knowledge can establish more