The *Bt* brinjal debate

A recent article in *Current Science*[1] for a unified academy of sciences in India begins with a reference to the uproar caused by the inter-academy report on genetically modified (GM) crops[2,3]. While the case for a unified academy is most welcome, increased participation of scientists would be of help in providing useful inputs on national issues involving science and technology. Justifiably, the poor response of most scientists on such matters may be because of their 'being busy' or the thought that their views would be welcome, only to be 'discarded unnoticed and unsung'[4]. As observed by Chokshi[5], there is considerable discussion on this topic in the public media[6], but there is very little scientific debate. It is sad to learn about the poor participation of our scientists in the debate on GM crops[3], in contrast to the active involvement of foreign scientists[7].

Following further scientific documentation on this subject, it is necessary to extend the debate on *Bt* brinjal. A recent article[8] documents the adverse effects of *Bt* transgenic crops on biodiversity. The authors have expressed their concern about *Bt* crops affecting non-target organisms, including beneficial predators and even earthworms. They also discuss the risky prospect of *Bt* brinjal giving rise to *Bt*-resistant brinjal borers. It is well known that the cotton bollworms develop resistance to *Bt*. Monsanto had come out with *Bt* cotton with two *Cry* genes. However, a recent study has shown that the bollworms are able to survive and reproduce in *Bt* hybrids even with two *Cry* genes[9]. A recent field study conducted in China shows the explosion of non-target pests in fields near *Bt*-cotton crops[10]. Though this is because of reduced pesticide use in the *Bt*-cotton farms, it is an adverse offshoot of the *Bt*-cotton protocol.

Another debatable point about GM crops is the maintenance of 300 m distance between GM and non-GM crops. This is a strategy practised in countries where mega farming in hundreds of acres is done. It is not relevant for India where a majority of the farmers have small pieces of land (less than an acre)[5]. Therefore, under our agricultural practice in small holdings, it is imminent that the *Bt*-resistant bollworms and borers would cross-pollinate our traditional varieties and destroy the biodiversity. Of course, several other factors such as insecticides, herbicides and urbanization pose a threat to biodiversity; however, this is not a justification to introduce a few more agents to alter the biodiversity.

We have more than a thousand varieties of brinjal in India, several of these are found to be resistant to the brinjal borer. 'With such a biodiversity providing useful genes, it is imprudent to develop *Bt*-transgenic brinjal that inevitably would break down within a few years'[8]. On the release of *Bt* brinjal for cultivation, there are two kinds of views among scientists: the 'wait and cautious' approach and the 'rush, why delay' view. The latter suggests the release of crops like *Bt* brinjal without delay, leaving the final stage of experimentation to the farmers. With several varieties of brinjal available, there is no need for introducing *Bt* brinjal now. With the current status of research and trial of *Bt* brinjal, it is not only imprudent[8] but also unwarranted to push it for cultivation in India, especially when the brinjal-growing states do not want it[7].

1. Desiraju, G. R., *Curr. Sci.*, 2010, **99**, 1510–1512.
2. Menon, G. I. and Siddharthan, R., *Curr. Sci.*, 2010, **99**, 1011–1012.
3. Indian National Science Academy inter academy report; http://www.insa.ac.in/
4. Balaram, P., *Curr. Sci.*, 2010, **99**, 1489–1490.
5. Chokshi, A. H., *Curr. Sci.*, 2010, **98**, 734.
6. Editorial, *The Hindu*, 20 October 2010.
7. Report, Ministry of Environment and Forests, Government of India, http://moef.nic.in/downloads/publicinformation/minister_REPORT.pdf
8. Kesavan, P. C. and Malarvannan, S., *Curr. Sci.*, 2010, **99**, 908–914.
9. Ranjith, M. T., Prabhuraj, A. and Srinivasa, Y. B., *Curr. Sci.*, 2010, **99**, 1602–1606.
10. Lu, Y. *et al.*, *Science*, 2010, **328**, 1151.

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White tiger in Assam: earliest authentic record of killing in India

Multiple sightings of the white tiger, a colour variant of *Panthera tigris tigris*, from central India to Assam have been reported[1]. White or partially white tigers are not uncommon in some of the dry open jungles of central India[2].

Authentic records of white tiger from India include the report of the first white tiger that reached England in 1820 and was exhibited alive in the Exeter Change (Exchange) menagerie at the tower of London. A second one was killed at Poona about 1892. In March 1899, a white tiger was shot in Upper Assam and the skin was sent to Calcutta. These reports are found in the *Game Animals of India* (1907)[3]. A record of a white tiger from Poona was published in the *Proceedings of the Zoological Society of London* in 1891 (ref. 4). Shooting of a white tigress was also reported in the *Indian Forester*, May 1909 (ref. 3). Records of cases of white tigers of the last 50 years prior to 1959 in the diaries of Rewa including a two-year-old male captured in December 1915 are available[4]. A description of this tiger appeared in the *Journal of the Bombay Natural History Society*[5]. It recorded not less than 17 white tigers shot in India between 1907 and 1933 (ref. 4). A white tiger that was shot in the Bilaspur District of the then Central Province at about 6 years prior to 1916 was also described[6]. E. P. Gee recorded accounts of 35 white tigers from the wild up to 1959 (ref. 7). Thus, shooting of white tiger was common between 1892 and 1922 in Orissa, Upper Assam, Bilaspur, Cooch Behar and Poona.

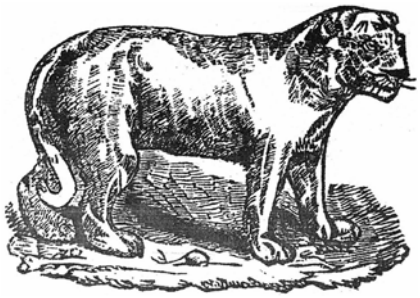

Figure 1. Drawing of a white tiger as appeared in *The Orunodoi*[10].

The history of white tiger in India can be traced in some of the paintings, which were drawn and recorded after 27 years of an incident in 1561 AD (ref. 8). However, the earliest authentic report of shooting of a white tiger in India is stated to be in 1907 (ref. 9).

Reports of white tigers in Assam are available. In Sivasagar District, Upper Assam, there is a tea estate called 'Bogabagh' meaning 'white tiger' in Assamese, and refers to two white tigers found there in the early 1900s (ref. 4).

Also, a report exists of the killing of a white tiger in Assam in March 1851. The unnoticed report is a much earlier record of the killing of a white tiger in India. According to *The Orunodoi*, a white tiger was beaten to death in Dibrugarh District, Assam and its head and skin were brought to 'Shrijut Doctor Sharlok Sahab'. The fur of the tiger was long and completely white without any spots[10]. The report is also supplemented with a drawing of the tiger (Figure 1). This may be the earliest authentic report of killing of a white tiger in India.

Capturing of a white tiger from Sadiya (District Tinsukia, Assam) during the Ahom King Kamaleswar Singha (1795–1811) is also mentioned in the report.

1. Xavier, N. K., 2010, *Curr. Sci.*, 2010, **99**(7), 894–895.
2. Prater, S. H., *The Book of Indian Animals*, Bombay Natural History Society, Bombay, 1980, p. 54.
3. Anon., *J. Bombay Nat. Hist. Soc.*, 1909, **19**(3), 744.
4. Gee, E. P., *J. Bombay Nat. Hist. Soc*., 1959, **56**(3), 581–587.
5. Editors, *J. Bombay Nat. Hist. Soc*., 1921, **27**(4), 932–933.
6. D'Abreu, E. A., *J. Bombay Nat. Hist. Soc*., 1916, **24**(4), 819.
7. http://en.wikipedia.org/wiki/White_tiger; accessed in 30 October 2010.
8. Divyabhanusinh, *J. Bombay Nat. Hist. Soc*., 1986, **83**(4), 163–165.
9. Patnaik, S. K. and Acharjyo, L. N., *Tiger Paper*, 1990, **17**(1), 8–10.
10. Anon., *The Orunodoi*, 1851, **6**(3), 45. (Reprint Edition, Publication Board, Assam, Guwahati, 1983).

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Chemicals management in India

As a signatory of the Stockholm Convention on Persistent Organic Pollutants (2001), the Indian Government was compelled to restrict the production and use of industrial chemicals and pesticides. However, the present situation is not encouraging. This may be due to the following reasons: (1) Lack of awareness, information and education about chemical hazards and international treaties related to chemicals. Higher rate of illiteracy plays a major role in this context. (2) Absence of regulatory mechanisms to monitor chemical production and disposal. (3) Lack of a database to measure chemical impacts on health and environment. (4) Lack of on-site disaster management plan in small-scale and medium-sized chemical industry. With respect to legislation regarding chemical management, India is well placed. In such a large country like India with its diverse spectrum of chemical manufacturing and consumption, laying of legislation is not an easy task. Proper execution is also required. This can be achieved by educating the people about chemicals and their impact on health and environment. Proper knowledge about pesticides and their effects on groundwater can prevent groundwater contamination. Increment of the inter-industry interaction and collaboration in discussing emerging scenarios after chemical release, environmental impacts, expectation, and roles and resources pooling will prevent on-site chemical disaster. The thrust areas should be groundwater quality, chemical residue in food, public and occupational health, storage and disposal of obsolete chemicals, chemical poisoning and chemical accident during transportation.

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