CORRESPONDENCE

ATRAZINE EXPLANATION

To the editor:

I find myself in general agreement with the thoughtful "Last Word" editorial by Rebecca Goldburg of the Environmental Defense Fund (*Bio/Technology* **6**:336, March '88). In response to her comments about atrazine, however, I'd like to take this opportunity to review some background information relating to our crop plant tolerance research with the herbicide.

The purpose of our research is to solve a specific and limited problem in the use of atrazine. We are *not* developing atrazine-resistant crops to create new uses for the product. This relatively inexpensive, broad-spectrum generic herbicide remains efficacious after more than 25 years.

In her editorial, Dr. Goldburg refers to atrazine as toxic. While we agree that all pesticides have some level of toxicity, we do not believe atrazine is toxic in the currently popular sense. Atrazine is toxic to susceptible green plants because even very low concentrations interfere with photosynthesis. However, toxic effects in animals are observed only at very high and exaggerated levels.

Some crop plants (such as corn) possess a natural tolerance to atrazine. Others (soybeans and tobacco, for example) are very susceptible to the herbicide. In most geographical areas, growers can rotate atrazine-protected corn and (atrazine-sensitive) soybeans with no herbicide damage to the latter crop. However, in some areas of the upper Midwest with a certain soil type and under certain weather conditions, atrazine sometimes does not degrade sufficiently within 10–12 months to preclude injury to soybeans planted the following year. If atrazine-tolerant soybeans existed, affected growers could use the herbicide on corn and rotate to soybeans without concern about potential injury.

The commercialization of atrazine-tolerant soybeans would not result in the use of more herbicides. The degree of atrazine tolerance conveyed would not, for example, allow application of the herbicide on soybeans. Atrazine would, however, become available as a replacement or alternative for related herbicides now being used on corn in the affected areas. Generally, growers can design more effective long-range weed control programs if they have several alternative herbicides available.

Also, in view of evolving weed control technology, it is uncertain whether atrazine-tolerant crop plants would have significant market potential.

The choice of this research project was technology driven. We had developed the technology to convey atrazine tolerance and we wanted the benefit of the additional knowledge and experience that field tests would provide for related research. The atrazine tolerance work represents only a small portion of our total research effort in agricultural biotechnology. It became public knowledge because of the field tests. Although we are not at liberty to discuss specifics of other projects due to proprietary considerations, I feel confident that Dr. Goldburg would advocate most of our efforts.

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ERRATUM

Figure 2 in the research paper "Gene Transfer into Sheep" (J. P. Simons et al., *Bio/Technology* **6**:179–183, Feb. '88) was reproduced inaccurately. The correctly shaded figure, and its legend, are reproduced below.

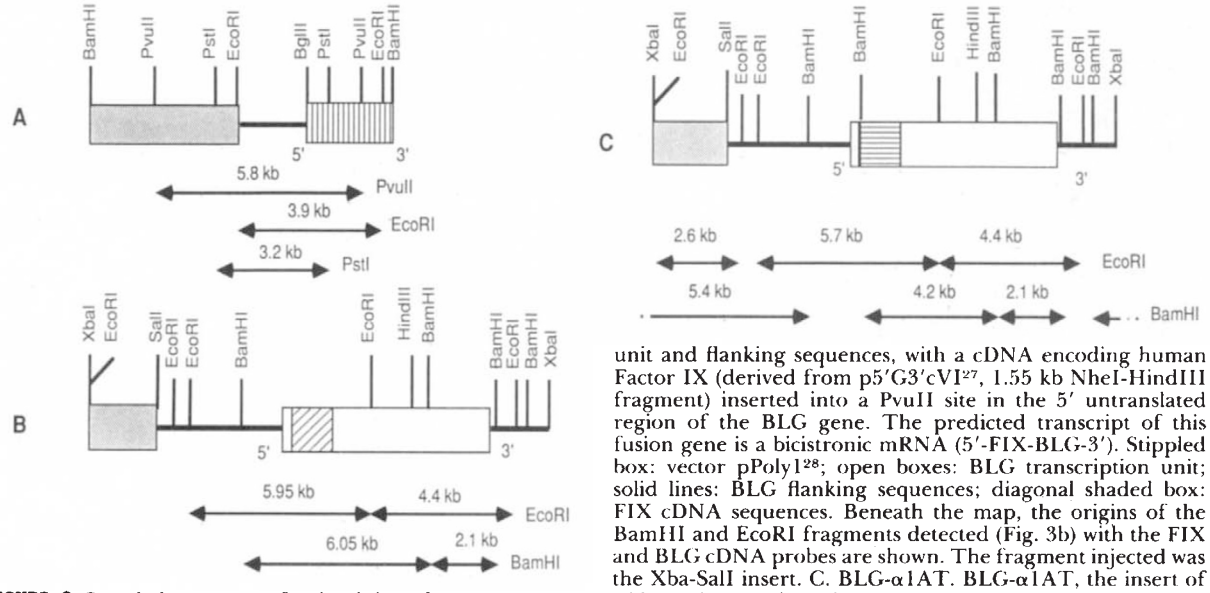

FIGURE 2 Restriction maps of microinjected constructs. A. Plasmid pMK[15]. Stippled box: pBR322 vector; solid line: mouse MT-1 promoter segment; vertical shaded box: HSV TK gene. Fragments relevant to the analysis of the transgenic sheep are indicated below the map. pMK was injected after linearization with BamHI. B. BLG-FIX. BLG-FIX, the insert of pSS1tgXS-FIX, is a 10.5 kb XbaI-SalI fragment from BLG genomic clone SS1[11,17], comprising the 4.9 kb transcription unit and flanking sequences, with a cDNA encoding human Factor IX (derived from p5′G3′cVI[27], 1.55 kb NheI-HindIII fragment) inserted into a PvuII site in the 5′ untranslated region of the BLG gene. The predicted transcript of this fusion gene is a bicistronic mRNA (5′-FIX-BLG-3′). Stippled box: vector pPoly1[28]; open boxes: BLG transcription unit; solid lines: BLG flanking sequences; diagonal shaded box: FIX cDNA sequences. Beneath the map, the origins of the BamHI and EcoRI fragments detected (Fig. 3b) with the FIX and BLG cDNA probes are shown. The fragment injected was the Xba-SalI insert. C. BLG-α1AT. BLG-α1AT, the insert of pSS1tgXS-α1AT is analogous to BLG-FIX except that in place of the FIX cDNA a human α1AT cDNA was inserted (p8α1ppg (a gift of R. Cortese), 1.3 kb TaqI-BstNI fragment). Horizontal shaded box: α1AT cDNA sequences. The fragment was injected as a mixture of XbaI-SalI insert and XbaI-linearized pSS1tgXS-α1AT. Beneath the map, the origins of the BamHI and EcoRI fragments detected (Fig. 3c) by probing with α1AT and BLG cDNA clones are shown.