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To:
Dr. Ahmed Djoghlaf
Executive Secretary
Convention on Biological Diversity
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Re: document UNEP/CBD/SBSTTA/13/3

18 October 2007

Dear Dr. Djoghlaf,

The Public Research and Regulation Initiative (PRRI) very much welcomes your approach of publishing the draft documents for the thirteenth meeting of the Subsidiary Body on Scientific, Technical and Technological for peer review.

The PRRI Working Group on GM Trees wishes to offer the following comments on document UNEP/CBD/SBSTTA/13/3 ("In-Depth Review of the Expanded Programme of Work on Forest Biological Diversity").

The members of the Working Group, of which the undersigned are the co-chairs, believe that section V of the draft document (p. 15, "Impacts of the use of genetically modified organisms") is flawed in that it fails to convey a sense of thorough, balanced and unbiased scrutiny of the existing scientific literature. As you know, such scrutiny is essential in order to consider both the potential risks and benefits of GM technology in a forestry context so that decision makers can make well informed decisions.

Here we offer comments of two general types. First, we comment specifically on paragraph 56 (page 16).

The issues raised in paragraph 56 pertain to risks associated with outcrossing of transgenes, which are indeed important considerations in relation to biodiversity. The document states that:

> "In an attempt to reduce the risk of transgenes escape, several methods of mitigation have been proposed. These methods are similar to the genetic use restriction technologies (GURTS) which have already been proposed for use in agricultural crops (2). However these methods are not without concern. It has been postulated that by eliminating pollen and flowers a large portion of the food web would be disrupted as the production of fruits and nuts would be prevented (13, 30).

A review of these papers, particularly references 2 and 30, have discussed these issues in detail, and pointed out how there are very many ways to avoid serious consequences for biodiversity when considered on a stand or landscape level. Both papers also point out how many of the largest biodiversity impacts are from intensive plantation culture itself, without respect to what variety, GM or otherwise, are used. For example, see the recent review by Stephens and Wagner (J. Forestry, Sept. 2007, 307-313). GM is a minor issue in the context of intensive plantation forestry, and there are many stand and landscape level options for mitigating negative impacts.

The paragraph also states that:

> "Further while planned sterility or harvesting trees before they are reproductive may be able to guard against the sexual spread of transgenes, these techniques would have no effect on the non-sexual transfers of transgenic material such as vegetative reproduction (13, 32)."

It has been long known that for the forestry species for which GM is being developed at a significant rate (eucalypts, poplars), vegetative propagation is predominantly a localized phenomenon. It does not provide for significant or rapid large scale spread. There are also no known cases where horizontal transfer to other organisms has been observed in the field, nor cases made for why such transfers would lead to ecological concern.

Finally the paragraph also states that:

> "Should genes for planned sterility (so called terminator genes) escape into wild gene pools the potential ramifications on the environment would be severe (2)."

The undersigned Dr. Strauss was the co-leading author of this paper (2), and underlines that the paper says no such thing. In fact, the paper provided simulations that show the exact opposite Sterility genes, even if they fail to completely block the reproductive process, will have no long-term ecosystem impact. Because of their fundamental nature, sterility genes reduce fitness and thus can only spread locally, at low frequency, and will soon be removed from the population. Even weak sterility genes (i.e. those that reduce fecundity, rather than eliminate all sexual reproduction) can drastically reduce the spread of transgenes that might otherwise have a beneficial effect in the wild. The failure to properly interpret the findings of this citation (2) brings the credibility of the entire section into serious question.

Finally, we provide some detailed suggestions on parts of the large summary table (cited as Figure 6, p. 22).

For nearly all the issues raised as negatives, there are similar risk/benefit considerations for conventional breeding and propagation, both for horticultural trees as well as for many other crops. *There is no basis to elevate these complexities, which are inherent to breeding, forestry, and agriculture itself, to international biodiversity issues because of the method of genetic improvement employed.* These suggestions are attached below. We also recommend that you also study a similar, and more balanced table that was published some years ago (Strauss et al. 2001, see link below). This paper was not cited, but it also considers both risks and benefits, as well as factors that might mitigate risks.

The papers can be downloaded at: http://www.cof.orst.edu/coops/tbgrc/Staff/strauss/publications.htm. The citation and direct link, if accessible, is: Strauss, S.H., Coventry, P., Campbell, M.M., Pryor, S.N., and Burley, J. (2001) Certification of genetically modified forest plantations. International Forestry Review, 3(2) 85-102. Thank you very much for considering our suggestions.

We look to attending the SBSTTA and to interacting in more detail at that time.

Sincerely,

Dr.Luciana Di Ciero
ESALQ/USP

Steven H. Strauss
Professor

APPENDIX

COMMENTS ON Figure 6: Potential positive and negative impacts of the use of genetically modified trees (CBD Secretariat, 2007). OUR COMMENTS ARE HIGHLIGHTED IN GRAY. *Only a few examples are given. Similar comments could be made for most of the issues in this table.*

1. Potential environmental impacts	
Positive	a) Reduced lignin content might reduce the need for chemicals and the amount of energy required for processing cellulose (19, 30, 32 46) b) Pollution originating from pulp mills might be decreased and fewer trees would need to be harvested to meet consumption needs (30) c) The need to apply broad spectrum pesticides in forested areas might be decreased because of insect resistant traits (3, 13, 20, 29, 32) d) Exposure of non-pest insects to pesticides might be reduced as the insecticidal agent would be targeted specifically to pests feeding on tree tissues (29, 32) e) Endangered or threatened tree species could be modified to resist or combat the impacts of invasive alien species by introducing insect resistance traits (46) f) Herbicide resistance would allow for the application of relatively benign broad spectrum herbicides in plantations, thus reducing the need to apply multiple herbicide treatments in a forested area (32, 46) g) Trees with increased stress tolerance could be used in the phytoremediation of contaminated soils (32, 37, 46) h) Modifying trees for increased productivity might reduce the need for old growth logging as high yield plantations could be used to fulfil timber needs (20, 46). i) Improved forest productivity means less area is needed to forest plantations, so those areas can be converted for agriculture to produce food. . j) If economically valuable species could be engineered such that they could be grown in various locations outside their traditional home range, it might allow for greater production (32), reducing pressure over natural forests that might be harvested for timber uses. k) Engineered trees for efficient use of boron and phosphorous can reduce the impact over use of non-renewable fertilizer sources. l) Genes for abiotic stress could be used in trees to conserve threatened trees species and/or improve growth and survival of planted trees. m) Trees with lower lignin levels may potentially affect soil structure and chemistry by allowing for accelerated rates of decomposition (3, 13, 46). This effect can also be positive because it decreases the time for nutrient recycling in the soil in commercial forest plantations. n) Pollen from many tree species is allergenic, and non-pollen producing species would not have this problem
Negative	a) As lignin makes it difficult for insects to digest plant materials, reduced lignin content may decrease the fitness of trees (29, 46) The lignin genes are often in families – with some members responsible for response to insect and disease and others to vascular lignification and this reservation need not be valid b) Decreased lignin might render trees more vulnerable to viral diseases (46) c) Trees with lower lignin levels may potentially affect soil structure and chemistry by allowing for accelerated rates of decomposition (3, 13, 46). This effect can be positive because it decreases the time for nutrient recycle in the soil in commercial forest plantations. If trees are harvested – taken out – of what relevance is this comment?

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	d) Insect resistant traits may lead to the increased development of pesticide resistant species (3, 13,32, 37, 46) The same is more true for insecticides – the genes used are multi-target and have been killing insects for millions of years e) Insect resistance might reduce the number of phytophagous and pollen-feeding insects present in a forest (30). Insect resistance traits tend to be specific to the target-insect genera or sub-families. f) Non-target herbivores (minor pest species) might be affected by insect resistant traits (40). This will be reduced by resistance management. g) There is a potential for insectivores to acquire toxins through the ingestion of herbivores which have fed on insect resistant species (40). The insect resistance genes are specific for target pests and do not have a significant effect on other organisms, apart from death/illness itself. This effect is more likely to happen using chemicals h) While insect resistance traits may suppress one insect pest, these traits may result in secondary pests increasing in numbers (30). This effect can happen using chemicals or non-GM resistsant varieities as well. l) By promoting the use of specific herbicides, herbicide resistant trees may lead to increased selection pressure for resistant weed biotypes as well as reinforce the use of broad spectrum herbicides (13, 29, 30, 44, 46). This impact is not inherent for GM plants but is an issue of weed control management. This is unlikely as herbicides are typically used in forests in the first few years of forest establishment, and that is unlikely to select for resistance q) Somaclonal variation can result in the manifestation of tree abnormalities (46). This is not applied only for GM trees, but for micropropagation also.
	i)

Original references of relevance
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2 Brunner, A. M. el al. (2007). Genetic containment of forest plantations, Tree Genetics & Genomes, 3(2), 75-100.

13 Farnum, P., Lucier, A and Meilan, R. (2007). Ecological and population genetics research imperatives for transgenic trees, Tree Genetics & Genomes, 3(2), 119-133.

14 Finstad, K., Bonfils, A.C., Shearer, W. and Macdonald, P. (2007). Trees with novel traits in Canada: Regulations and related scientific issues, Tree Genetics & Genomes, 3(2), 135-139.

30 Johnson, B. and Kirby K. (2001). Potential impacts of genetically modified trees on biodiversity of forestry plantations: A global perspective. Proceedings of the First International Symposium on Ecological and Societal Aspects of Transgenic Plantations, pp. 176-186.

32 Mathews, J.H and Campbell, M.M. (2000). The advantages and disadvantages of the application of genetic engineering to forest trees: a discussion, Forestry, 73(4), 371-380.