The Nuclear Forest Recovery Zone

Myco-remediation of the Japanese Landscape After Radioactive Fallout

Many people have written me and asked more or less the same question: "What would you do to help heal the Japanese landscape around the failing nuclear reactors?"

The enormity and unprecedented nature of this combined natural and human-made disaster will require a massive and completely novel approach to management and remediation. And with this comes a never before seen opportunity for collaboration, research and wisdom.

The nuclear fallout will make continued human habitation in close proximity to the reactors untenable. The earthquake and tsunami created enormous debris fields near the nuclear reactors. Since much of this debris is wood, and many fungi useful in mycoremediation are wood decomposers and build the foundation of forest ecosystems, I have the following suggestions:

1) Evacuate the region around the reactors.

2) Establish a high-level, diversified remediation team including foresters, mycologists, nuclear and radiation experts, government officials, and citizens.

3) Establish a fenced off Nuclear Forest Recovery Zone.

4) Chip the wood debris from the destroyed buildings and trees and spread throughout areas suffering from high levels of radioactive contamination.

5) Mulch the landscape with the chipped wood debris to a minimum depth of 12-24 inches.

6) Plant native deciduous and conifer trees, along with hyper-accumulating mycorrhizal mushrooms, particularly *Gomphidius glutinosus, Craterellus tubaeformis,* and *Laccaria amethystina* (all native to pines). *G. glutinosus* has been reported to absorb – via the mycelium – and concentrate radioactive Cesium 137 more than 10,000-fold over ambient background levels. Many other mycorrhizal mushroom species also hyper-accumulate.

7) Wait until mushrooms form and then harvest them under Radioactive HAZMAT protocols.

8) Continuously remove the mushrooms, which have now concentrated the radioactivity, particularly Cesium 137, to an incinerator. Burning the mushroom will

result in radioactive ash. This ash can be further refined and the resulting concentrates vitrified (placed into glass) or stored using other state-of-the-art storage technologies.

Gomphidius glutinosus hyper-accumulates radioactive Cesium 137

By sampling other mushroom-forming fungi for their selective ability to hyper-accumulate radioactivity, we can learn a great deal while helping the ecosystem recover. Not only will some mushroom species hyper-accumulate radioactive compounds, but research has also shown that some mycorrhizal fungi bind and sequester radioactive elements so they remain immobilized for extended periods of time. Surprisingly, we learned from the Chernobyl disaster that many species of melanin-producing fungi have their growth stimulated by radiation.

The knowledge gained through this collaborative process would not only benefit the areas affected by the current crisis, but would also help with preparedness and future remediation responses.

How long would this remediation effort take? I have no clear idea but suggest this may require decades. However, a forested national park could emerge –The Nuclear Forest Recovery Zone – and eventually benefit future generations with its many ecological and cultural attributes.

I do not know of any other practical remedy. I do know that we have an unprecedented opportunity to work together toward solutions that make sense.

For references, see the selected list below and please consult my latest book, *Mycelium Running: How Mushrooms Can Help Save the World* (Ten Speed Press, Berkeley or www.fungi.com). Utilizing search engines of the scientific literature will also reveal more corroborative references.

Paul Stamets

Selected Bibliography on Fungal Interactions with Radiation

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