

## Chiyo's Last Words to Fukushima

By Taki Yuriko

Translated by John Saxon

Her unceasing mantra was,

“Though I die, I will go.

Even alone, I will go.”

Chiyo, a graduate student at Okinawa's Ryukyu University  
(the national university in Japan's far south, 1750 km from Fukushima),  
Moved the hearts at her research laboratory.

Like a mother determined to rescue

Her children from Fukushima, she said,

“Just because the government keeps evasively saying,

‘There is no immediate danger’

Doesn't mean that it's

Actually safe to live there,”

Before the accident,

An area of such high radiation levels

Would certainly have been declared

Off limits.

Yet the government has built temporary housing

In this very area.

Her research, entitled

“The biological impacts of the Fukushima nuclear accident on the pale  
grass blue butterfly,”

Investigates the internal damage,

Both inherited,

And ingested,

From low level radiation in a radioactive habitat.  
The chosen research subject was  
The pale grass blue butterfly,  
Which has six generations per year.  
It is found throughout Japan,  
Lives within a foot of the ground,  
And does not range widely.  
For the first  $\frac{1}{4}$  of its life, its caterpillar form  
Eats only the woodsorrel.

To begin with, the experiment needed  
Already-exposed caterpillars and  
Fresh woodsorrel from Fukushima.

Less than two months after the accident, the research began.❖1

Since young researchers are not allowed  
Into areas of high radiation, ❖2  
Chiyo, at age 56, went herself.  
Her husband, residing in Tokyo, also accompanied her.  
Every 10 days, she commuted  
From Okinawa to Fukushima,  
Each trip, she stayed 3 days  
In the fallout zone.

Many butterflies showed impaired movement.  
Later it was realized that this behavior

Mirrored the aimless behaviors  
Observed at Hiroshima and Nagasaki. ✂ 3



Caterpillars still alive in the radioactive areas  
Became generation #1.

Measurements of ground radiation levels  
Correlated with maturation delays found in the caterpillars.  
Although wings did emerge,  
Both the wings and the antennae  
Showed signs of deformity, such as antennae bifurcation at the top,  
As well as reductions in size.

Fukushima butterflies taken to Okinawa and  
Raised under identical radioactive conditions  
Produced the same shape abnormalities  
In generation #2;  
The survival rate was under 20%.

Generations #5 and #7 produced  
The lowest survival rates.

When pale blue grass butterflies from Okinawa  
Were artificially exposed to Fukushima level radiation,  
And fed Fukushima woodsorrel,  
The same results were observed.

However, when Fukushima pale blue grass butterflies  
Were moved to Okinawa to be cared for  
And fed Okinawa woodsorrel,  
Generation #2's survival rate rose  
From under 20% to over 70%.  
Shape abnormalities also disappeared.



Chiyo did not become a scientific researcher  
Until almost her 60<sup>th</sup> year.  
Her presentations before audiences  
Were not particularly sparkling,  
Full of “uhs” and “ers”.  
The paper given by her project leader, Professor Joji Otaki,  
Was much more understandable to subject specialists.

But Chiyo's conclusion was more definite.  
“Please leave these areas  
Where we observed the butterfly deformities  
Immediately.”  
“Eat no radioactively contaminated food products.”  
All Fukushima residents could thus greatly reduce  
Their deadly risk of radioactive damage.

On 10/28/2015, Chiyo died.  
Katsuma Yagasaki, professor emeritus of  
Ryukyu National University in Okinawa  
Addressed the crowd before her lifeless form:

“Chiyo Nohara burst onto the scene  
And accomplished a great feat  
In the short span of 4 ½ years.”

Chiyo’s own body  
Betrayed the telltale signs of radiation  
From her continued travel to Fukushima.

This important information could save lives,  
But it is being hidden.

“Humans and butterflies are different.”  
“We don’t yet understand radiation’s effect  
Upon human beings. Restrain yourselves.”  
The media and many of Japan’s scientists  
Give various reasons  
For squelching this research.

The research lab has also been squelched  
With a recent funding cut.

## NOTE

※ 1 Research into the post-accident effects of radiation on the genes of living things did not begin even at Chernobyl until five years after the fact. It was highly probable that living things strongly affected by the radiation had already died immediately after the accident. So Chiyo’s

research was the first ever to start such research so soon after the accident and is therefore highly valued. After Chiyo's death, fellow researchers continue with the work of analyzing the genetic information from the pale blue grass butterfly genome.

✂ 2 The effects of radioactive exposure are considered to be more pronounced in young people. In addition, women notably suffer the effects more severely than men.

✂ 3 By "impaired movement", we mean "attributes such as physical strength and resistance to disease becoming weaker, the body tiring easily or becoming more sluggish, plus other phenomena such as movements becoming dull, and persons not being able to work properly were all observed many times in Hiroshima's and Nagasaki's radiation victims.

## References

1) An article from Chiyo's group was featured in the electronic edition of the internationally influential English scientific journal "Nature".

<http://www.nature.com/articles/srep00570>

2) The paper garnered a huge response abroad.

SPIEGEL (Germany)

<http://www.spiegel.de/wissenschaft/natur/fukushima-strahlung-fuehrt-schmetterlingen-zu-mutationen-a-849972.html>

BBC (UK)

<http://www.bbc.co.uk/news/science-environment-19245818>

Lemonde (France)

[http://www.lemonde.fr/planete/article/2012/08/15/des-papillons-mutants-autour-de-fukushima\\_1746252\\_3244.html](http://www.lemonde.fr/planete/article/2012/08/15/des-papillons-mutants-autour-de-fukushima_1746252_3244.html)

ABC (USA)

<http://www.abc.net.au/news/2012-08-13/fukushima-mutant-butterflies/4194240>

CNN (USA)

<http://www.youtube.com/watch?v=1yVnN0tlz5k>

FOX TV (USA)

<http://video.foxnews.com/v/1786844712001/mutant-butterflies-reportedly-caused-by-japan-nuke-disaster/?#sp=show-clips>

3) Chiyo presented her paper in Switzerland.

<http://www.lulu.com/shop/independentwho/proceedings-of-the-scientific-and-citizen-forum-on-the-genetic-effects-of-ionizing-radiatio/paperback/product-22427584.html>

4) The following message was given by Chiyo's husband, Junji Nohara, who, from 2011 to 2013, helped collect the pale blue grass butterflies and the wood sorrel for the study.

"This paper demonstrates the effects on offspring of internal radioactive damage due to ingestion and how the choice of what is ingested, to a certain extent, can avoid that internal damage. However, what has not been said is that the evacuees were placed in cities such as Koriyama and Motoyama where radiation levels were still high compared with other areas. There is deep anger that the administration required people to live in temporary housing in these very cities for long periods of time. I also collected edible grass by the monitoring posts in these cities, but the yearly radiation levels there measured several times higher there than the national standard. Just working there for 2-3 hours gave me headaches. But the residents of this region have gotten accustomed to it and have blindly accepted the 'it's decontaminated' story and began leading normal lives. In this regard, although Japan's standard is 1-5 millisieverts per year for returning home, in Ukraine one must move out of a 1-5 millisievert zone. In Japan, if there is doubt as to whether an area exceeds 5 millisieverts, it receives the 'decontaminated' designation if the monitoring post set up in the area saying so. I believe that, for each monitoring area in which multiple monitoring posts are set up, the instrument with the lowest value becomes the publicized value so that more areas can be classified as 'decontaminated.' It's not like the government has friends or family in these areas, so for them, 'whatever happens is fine, right?' This the height of irresponsibility, and it infuriates me."