

Maddox

DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY
HARVARD UNIVERSITY



7 Divinity Avenue
Cambridge, Massachusetts 02138

22 February, 1985

Mr. John Maddox
Nature
4 Little Essex Street
London WC2R 3LF
ENGLAND

Dear John:

Here is our reply to the letter of Rosen *et al.* (Nature, 24 January). I also enclose a copy of my letter to Mirocha and Rosen of October 19, 1983, since it is cited in our present letter.

Both the new White House statement on Soviet non-compliance and the new Weinberger posture statement prominently refer to Soviet use of toxin weapons as proven fact. Also, the Yellow Rain exponents at Fort Detrick are expected to issue a new defense of their case, following a classified one they produced in June. And Nowicke, Seeley and I are writing an article for Scientific American. So the issue will not soon go away. I am therefore glad to know that you are still considering a Nature conference on the subject. You could get good papers on each aspect: the accounts of local inhabitants; the nature of yellow rain samples; the trichothecene analyses; trichothecene pharmacokinetics; suitability of trichothecenes for CW; other relevant allegations of CW since World War II, *etc.*

As ever,

M. M.

Enclosures: Letter to Nature (2/22/85)
Letter to Mirocha
and Rosen (10/19/83)

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26
~~22~~ February, 1985

Sir -

In "Yellow rain and the bee faeces theory"¹, Rosen et al. fail to substantiate their contention that environmental samples from southeast Asia provide evidence of chemical warfare. They base their argument on reports by Mirocha and Rosen of finding trichothecene mycotoxins in six samples obtained from alleged chemical attack sites^{2,3}. In arguing that the toxins they reported were not of natural origin, Rosen et al. astonishingly cite the fact that the U.S. Army Chemical Systems Laboratory has found no trichothecenes in samples from southeast Asia. This incorrectly implies that the Army's samples were controls. In fact, at least 60 of the Army's samples, like those of Mirocha and Rosen, were from alleged chemical attack sites. ~~As far as we know~~ The Army laboratory has not ~~found~~ trichothecenes in any sample from such sites. ~~In October, 1983 one of us (MM) wrote to Mirocha and Rosen asking "Why does the Army find no positives out of 60 samples while Mirocha plus Rosen find six out of six positive?"~~ ~~MM's question was received.~~ The evidence for trichothecenes at sites of alleged chemical warfare is ~~therefore~~ inconclu-

Rosen and Mirocha have known of ~~the~~ problem since this since at least October, 1983, when one of us ^(MM) wrote to them asking " — "

sive at best: 6 positives out of 6 samples versus 60 negatives out of 60 samples.

Rosen et al. ignore the fact that it is pollen, not trichothecenes, which is the consistent and confirmed finding in samples of yellow rain, the alleged chemical warfare agent. Since 1979, many samples have been turned in by Hmong refugees from Laos, and then examined by U.S. and other investigators. In November 1982, the head of the U.S. Army Laboratory cited above stated - "Most of the samples that are of yellow rain are fairly dry and they have a high level of pollen grains in them"⁴. Indeed, to our knowledge, all samples of yellow spots and powders from sites of alleged chemical attack that have been examined under the microscope, including those analysed by Mirocha and Rosen, consist largely of pollen. This is also true of honeybee faeces. Moreover, our analysis of the pollen types in samples of the alleged agent collected by Hmong in April 1981 and in March 1982, and comparison with pollen gathered by local honeybees strongly support the identification of yellow rain as the faeces of southeast Asian honeybees⁵.

Rosen et al. also ignore descriptions of the alleged agent by Hmong refugees. Summarizing interviews with Hmong for the period 1978-1982, the official reports of Secretaries of State Alexander Haig and George Shultz state that the alleged agent is yellow and falls like rain^{6,7}. This resembles the mass defaecation

tion flights of the giant Asian honeybee Apis dorsata which two of us (M.M. and T.D.S.) observed in Thailand in March 1984⁸. Although now realized to be common, such flights were previously unknown to bee scientists, perhaps because the flights are too high to be noticed, even though hundreds of thousands of bees may be involved. Further, nearly all the Hmong to whom we showed bee faeces on leaves failed to identify them. Some said they were "kemi", a Hmong term for the alleged chemical warfare agent.

Thus, our conclusion that yellow rain is probably the faeces of honeybees and not a chemical warfare agent is supported by Hmong accounts of its appearance, by pollen analysis, and by observations of honeybee behavior in southeast Asia.

Relevant studies of the yellow rain phenomenon done in several countries, particularly in government laboratories, have still to be made public. It is to be hoped that the responsible officials will make every reasonable effort to move further investigation of this problem into the normal channels of scientific communication.

Peter S. Ashton
Arnold Arboretum,
Harvard University,
Jamaica Plain, Massachusetts 02130 USA

Matthew Meselson

Matthew Meselson
Department of Biochemistry and Molecular Biology,
Harvard University,
Cambridge, Massachusetts 02138 USA

Joan W. Nowicke
Botany Department, National Museum of Natural History,
Smithsonian Institution,
Washington, D.C. 20560 USA

J. P. Perry Robinson
Science Policy Research Unit,
University of Sussex,
Brighton, BN1 9RF ENGLAND

Thomas D. Seeley
Department of Biology,
Yale University,
New Haven, Connecticut 06511 USA

References

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7 Divinity Avenue
Cambridge, Massachusetts 02138

October 19, 1983

Dr. Chester Mirocha
Department of Plant Pathology
University of Minnesota
1519 Gortner Avenue
St. Paul, MN 55108

Dr. Joseph Rosen
Department of Food Science
Cook College
Rutgers University
New Brunswick, NJ 08903

Dear Chester and Joe,

Following up on our discussion at dinner in New York last Friday, I telephoned Bill Sarver yesterday to get a clearer understanding of how the analyses done in his laboratory relate and compare to those you have done. This is a summary of what I understand to be the facts:

- 1) Sarver's lab has analyzed by GC/MS about 60 environmental samples from alleged attack sites in Southeast Asia for T2 and certain other trichothecenes.
- 2) Based on an earlier telephone conversation with Bill and his summary in Science (15 July 1983, page 242), these samples appear to be 10 of yellow powder, 10 of water and about 40 of foliage. Some of the foliage samples may have included yellow spots or powder.

- 3) In Bill's lab, all of these samples tested negative for trichothecenes. The detection limit was in the mid parts per billion range, about 60-80 ppb.
- 4) Only one of these samples was tested by either of you. This was the sample Chester refers to as FS704B (or FS704D). Fifty mg of it are reported to have been received by Chester on 20 (or 23) Oct, 1981 and to have contained 143 ppm of T2, 27 ppm of DAS and a trace of zearalenone. This is the highest T2 level reported for any yellow rain sample. Full mass spectra for T2 and DAS GC fractions of the TFA derivatized material are given in figures 5A and 5B of the manuscript by Watson, Mirocha and Hayes submitted to the JOAC. Sarver's lab analyzed a portion of the same sample about a year after Chester did and found no trichothecenes. During that time, the material had been kept at room temperature.
- 5) Only one environmental sample has tested positive for trichothecenes in Sarver's laboratory. It was a CHCl_3 swab from part of the surface of a Soviet gas mask, said by Gary Crocker to have been purchased in Kabul. Bill's lab found T2 corresponding to approximately 1/2 - 1 microgram per 1/4 of the mask surface. Two other labs, including Mirocha's, tested swabs from the same mask and also found T2.

The Sarver lab finding of no positives out of about 60 environmental samples from sites of alleged attack in Southeast Asia contrasts with Chester's finding of five out of five positives (excluding the 'pink' sample) and Joe's finding of one out of one positive. Some details regarding these samples are summarized in the attached table, which I believe includes all environmental samples from alleged attack sites in Southeast Asia analyzed in your laboratories.

Why does Sarver find no positives out of ca 60 samples from Southeast Asia while Mirocha plus Rosen find six out of

six positive (excluding the pink)? In particular, why does Sarver find no T2 and Mirocha 143 ppm of T2 in aliquots of the same sample? The apparent difference corresponds to a factor of more than 1,000 between what Mirocha reports and what Sarver presumably could have detected. Is this a false negative, a false positive or are both labs right?

- (a) False negative. Could Sarver's procedure, while able to detect T2 in spiked controls, be unable to recover even a very small fraction of it from a natural matrix?
- (b) False positive. Could laboratory contamination have occurred at so high a level? Could some compound have mimicked derivatized T2 in GC/MS under Mirocha's conditions but not under Sarver's?
- (c) Decomposition of T2. Decomposition by a factor of about 1,000 would presumably be required.
- (d) Sample heterogeneity. This seems the least likely explanation for so large a discrepancy.

If we require an explanation that also accounts for the overall lack of positives in Sarver's analyses and the high proportion of positives found by Mirocha plus Rosen, explanation (d) above becomes even less likely.

This all seems quite baffling. What do you make of it? And what do you think should be done?

Sincerely,

Matthew

Matthew Meselson

MM/db

Enclosure

cc: Dr. Emery W. Sarver
Dr. Joshua Lederberg

Environmental Samples From Alleged Attack Sites in Southeast Asia Reported to Contain Trichothecenes

Sample	Nature	Origin	Date collected	Received by	Date	Amount received	Findings Reported (ppm)				Pollen
							T2	DAS	NIV	DON	
FS698A FS698B	leaf and stem fragments	Kampuchea	Mar 81	Mirocha	July 81	200mg	3.17 35.7	109 21.7	59.1 (unspiked) 0 (aliquot of above spiked with T2)	not tested	
FS704A	water with debris	Kampuchea, same site as above	Mar 81	Mirocha	10 Oct '81	10ml; 33mg residue on evaporation	0	trace	0 66(residue basis) 0.22(water basis)	not tested	
FS704B (or D)	rock scraping (yellow powder)	Laos	13 Mar 81	Mirocha	10 Oct 81	140mg spilled 20(or23) 50mg Oct 81	143	27	0 0	yes	
				Sarver	Fall(?) 82	?	0	0	0 0		
FS704C	rock scraping (yellow powder, very small sample previously extracted with methanol)	Laos	2 Apr 81	Mirocha	10 Oct 81	0.1mg		10-100(?)		not tested(?)	
Thai	yellow spots on vegetation	Thailand	19 Feb 82	Mirocha	?	?	0.086	0.30	0 0	yes	
ABC News	yellow powder scraped from vegetation	Laos	Mar 81	Rosen	Fall(?) 81	43mg	48	43	56	yes	

October 19, 1983