

THE BROOKLYN INSTITUTE OF ARTS AND SCIENCES
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April 29, 1952

Dr. Joshua Lederberg
Department of Genetics
University of Wisconsin
Madison 6, Wisconsin

Dear Dr. Lederberg:

Thank you for the return of my manuscript entitled "Viruses that Reproduce in Plants and Insects". I am glad that you found it of interest in connection with your review on the genetic implications of symbioses.

A number of years ago I carried out two experiments to test the possible transmission of clover club-leaf virus by means of the sperm to the young. I am enclosing a table showing the results. The table, I think, is self-explanatory. You will see that I included a test for the transmission of wound-tumor virus by means of either the egg or the sperm to the young. It is obvious from these data that the clover club-leaf virus passes from parents to young by way of the egg. The one insect out of 120 which proved infective in the progeny derived from viruliferous males crossed with non-viruliferous females, may have been due to transmission by way of the sperm. I have a great deal of evidence indicating that alfalfa is immune to the clover club-leaf virus. The one positive result is certainly inconclusive, and I do not want to publish this result without further testing. We now have better biological material for making the test, and I hope to carry out further experiments on this point at the University of Illinois. The one infective insect from parents carrying wound-tumor virus can now be attributed to a small amount of transmission of this virus through the egg. Again, I have a great deal of information indicating that alfalfa is immune to wound-tumor virus and within the past year I have carried out experiments that have demonstrated conclusively that between 1 and 2% of the progeny from the parents carrying wound-tumor virus are infective. I have also shown that the New Jersey potato yellow-dwarf virus carried by Agallia constricta infects between 1 and 2% of the eggs deposited by viruliferous parents. These figures are in marked contrast with those for rice stunt virus and clover club leaf virus. For example, 90 to 95% of the progeny of Agalliopsis novella carrying clover club-leaf virus normally receive the virus from their parents.

The possible transovarian transmission of aster yellows virus has been tested many times without any indication that it occurs. However, my recent results with wound-tumor virus and New Jersey potato yellow-dwarf virus tempt me to retest the aster yellows virus once more.

The clover club-leaf virus can be inactivated in the leafhoppers by maintaining them at 39° C. for four days. The progeny from leafhoppers treated in this manner are also free from virus.

Dr. Joshua Lederberg

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As you recall Fukushima ran his experiments by transferring each insect to a fresh plant each day of its life.

I have many results which indicate that virus-carrying female leafhoppers may fail to infect plants during their lifetime and, yet, will produce infective progeny. However, because in my experiments the leafhoppers which were used to continue the line of descent were always maintained on immune alfalfa and because the insects that were tested on crimson clover were then discarded, I do not have direct evidence on this point as does Fukushima. The indirect evidence I have consists of many tests in which leafhoppers or even leafhopper families failed to transmit to any plant during a 9-week test period, yet sibs on alfalfa produced a high proportion of infective progeny. I have a good deal of data that was not included in table 2. I am convinced that Fukushima's data on this point are sound.

Except for the above information on aster yellows virus and the percentage transmission of the clover club-leaf virus through the egg, none of the data have been published. I shall be glad to have you refer to the evidence as a "private communication" from me if you wish. However, please do not publish a detailed account or the enclosed table.

I shall be glad to send you reprints of my publications on this subject. If you have any other questions, I shall be glad to answer them.

I was very much interested in your recent findings about transduction in Salmonella. If the phage particles are actually carrying genetic characters of the host bacterium, it will be a most interesting development.

With best regards, I am

Yours sincerely,

L. M. Black

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TEST FOR THE TRANSMISSION OF CLOVER CLUB-LEAF
AND WOUND-TUMOR VIRUS FROM PARENT AGALLIOPSIS NOVELLA TO THEIR YOUNG

Experiment	Females carrying club-leaf virus X virus-free males.	Males carrying club-leaf virus X virus-free females.	Males X females both carrying wound-tumor virus.
1	$\frac{18}{60}$ *	$\frac{0}{60}$	$\frac{0}{60}$
2	$\frac{23}{60}$	$\frac{1}{60}$	$\frac{1}{60}$

* Number of insects infective over number of insects tested.

Insects laid their eggs in alfalfa, immune to both viruses, and young reared on the same alfalfa plants until tested on crimson clover.

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