

Influence of Environmental Change upon Sensitivity of *Drosophila* Larvae to Ultraviolet Radiation.

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(Introduced by Raymond Hussey.)

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We have developed in this laboratory a respirometer^{1, 2, 3} capable of use under any conditions of constant humidity, and a technique of maintenance of *drosophila* larvae over periods of several days for respiratory studies. The technique and food ordinarily used is described in a report⁴ of a study of immediate and subsequent effects of X-ray irradiation upon CO₂ respiration of larvae. In studies with ultraviolet light no significant effect upon duration of the prepupal period had been observed such as the extension^{5, 6, 7} when X-rays were employed; but it seemed worth while to investigate the possibility that similar effects upon respiration might be obtained. Some striking similarities in the action of these two types of radiation were observed,⁸ following which we were able to develop a means of affecting the sensitivity of the larvae to ultraviolet radiations.

Six random lots* of larvae (C₁, C₂, C₃, I₁, I₂, I₃) were maintained simultaneously as in the X-ray experiments mentioned above⁴ except additions of glacial acetic acid were made to the regular 25 ml. of food as follows:

0.5 ml. for C₁ and I₁
1.0 ml. for C₂ and I₂ and
1.5 ml. for C₃ and I₃, each.

Respiration of CO₂ was observed as usual and the lots designated by *I* were irradiated simultaneously with the radiations from a mercury arc in quartz for ½ hour in a stream of air at 26°C. when they had attained a median age of approximately 3.5 days. The

¹ Thompson, W. R., *J. Gen. Physiol.*, 1932, **16**, 5.

² Thompson, W. R., and Tennant, R., *J. Gen. Physiol.*, 1932, **16**, 23.

³ Thompson, W. R., and Tennant, R., *J. Gen. Physiol.*, 1932, **16**, 27.

⁴ Unpublished.

⁵ Hussey, R., Thompson, W. R., and Calhoun, E. T., *Science*, 1927, **66**, 65.

⁶ Tennant, R., *Science*, 1931, **73**, 567.

⁷ Hussey, R., Thompson, W. R., Tennant, R., and Campbell, N. D., *J. Gen. Physiol.*, 1932, **16**, 207.

⁸ Unpublished.

* Several hundred larvae were used in each lot, approximately 300 to 500.

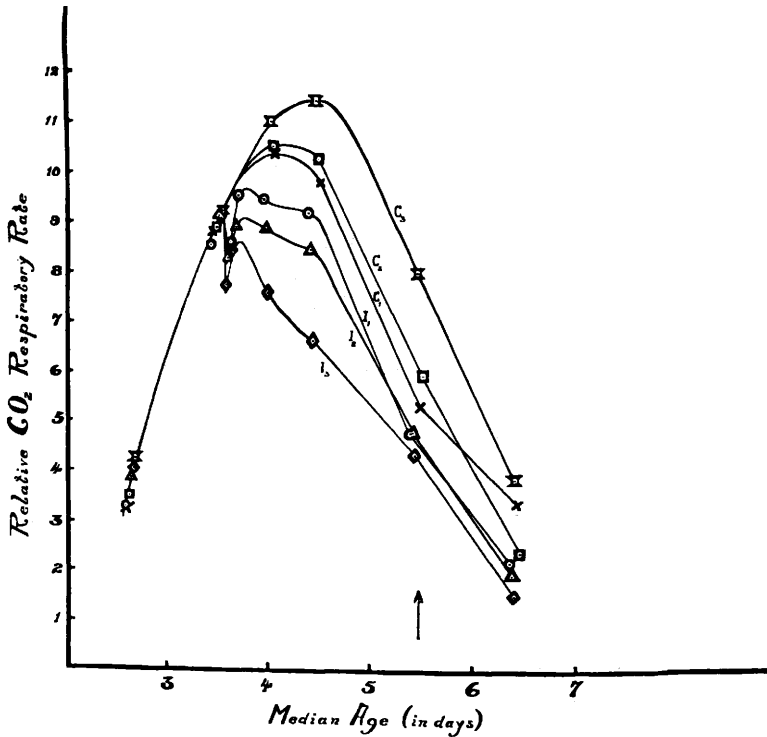


FIG. 1.

results are presented graphically in Fig. 1, where the ordinates of all curves are proportional to CO₂ respiratory rate, but in the case of each lot multiplied by a constant in order to superimpose their early portions. However, the ordinate scale approximately represents 10⁻⁶ moles per minute. The abscissae represents time in days during the experiment (integral values at midnight), and approximately the median age of the drosophilae. The median age at pupation (P) was sensibly the same in all cases and is indicated by an arrow on the chart. That sensitivity to irradiation increases with increase in acetic acid concentration is obvious here, as in the case of another experience in which, however, I₃ and C₃ were omitted. We hope to extend these studies to include similar observations on relative sensitivity to other forms of radiation such as X-rays.