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Presence of SH-Compounds in Non-Developing Embryos.

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Hammett[1] points out that the —SH group is the essential chemical stimulus for cell division. He also concludes[2] that the greater the natural cell division activity the greater the degree of reaction to the chemical groups. Coldwater[3] regards the nitroprusside reaction as indicating the presence of protein-fixed —SH groups, and finds a high concentration of this sulphydryl in areas of regenerating tissues undergoing proliferative growth. Thompson and Voegtlin,[4] Murray,[5] and Yaoi[6] have found the glutathione content of embryos of the chick and rat to be at a maximum in early development and to decrease with age.

One might infer from the above that if embryos were tested for the —SH groups at periods of marked cellular activity a much stronger reaction would be obtained than if they were tested at periods of relative inactivity. The embryo of the grasshopper, *Melanoplus differentialis,* is favorable material for this test as it can be obtained in large numbers, is easily dissected out, and is so small that it is quickly saturated with the sodium nitroprusside. Its development may be divided into 3 definite periods. First, a period of rapid embryonic growth for 21 days (at 25°C.) which is followed by a period of apparent inactivity lasting from a few days to several months. This period (diapause) is marked by the lack

[1] Hammett, F. S., *Protoplasma,* 1929, **7**, 297.

[2] Hammett, F. S., and Hammett, D. W., *Protoplasma,* 1932, **16**, 253.

[3] Coldwater, K. B., *J. Exp. Zool.,* 1933, **65**, 43.

[4] Thompson, J. W., and Voegtlin, C., *J. Biol. Chem.,* 1926, **70**, 793.

[5] Murray, H. A., *J. Gen. Physiol.,* 1926, **51**, 613.

[6] Yaoi, H., *Jap. J. Exp. Med.,* 1928, **7**, 135.

of any movement, absence of mitosis (Slifer[7]) and very low rates of respiratory metabolism (Bodine[8]). The third period begins with the resumption of mitotic activity followed by blastokinesis. After the embryo has revolved, it grows rapidly and engulfs the remaining yolk. The third phase marks the completion of differentiation and embryonic organogenesis.

This preliminary report on the glutathione reaction is based upon observations of 13 embryos in early development, 70 embryos in diapause, and 30 in various stages of later development. The nitroprusside test for —SH groups was used and the color lasted from 18 to 90 seconds. All embryos (even those in diapause) gave a definite positive color reaction. The stain was apparently more intense and lasting where the tissues were thicker. Yolk did not stain and embryonic membranes colored only momentarily.

It is significant that embryos in all stages of diapause showed an intense color reaction indicating the presence of the protein bound —SH groups. It is possible that the —SH group relates more to potential cell activity, rather than indicating active cell division as postulated.

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Physico-chemical Aspects of Sex in Plants.*

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The excellent review by Joyet-Lavergne[1] of the earlier work on this problem obviates the need of recapitulation here. It may be stated, however, that the formative responses of the sexes in dioecious plants under various conditions have been much more thoroughly recorded than their concomitant physiology. This investigation was undertaken in an attempt to secure comprehensive data concerning normal staminate and pistillate metabolism in

[7] Slifer, E. H., *Physiol. Zool.*, 1930, **3**, 503; *J. Morph. and Physiol.*, 1931, **51**, 613.

[8] Bodine, J. H., *Physiol. Zool.*, 1932, **5**, 538.

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[1] Joyet-Lavergne, Ph., *La Physico-Chimie De La Sexualite.* Borntraeger, Berlin, 1931.