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POLLEN TUBE GROWTH IN THE TOMATO IN  
RELATION TO HYBRID SEED PRODUCTIONR. W. RICHARDSON, JR.  
*University of Minnesota*

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A TUMOROUS HEAD MUTATION IN *DROSOPHILA*  
*MELANOGASTER*ROY P. THELANDER  
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An abnormality, expressed as irregular growths in the head region of *Drosophila melanogaster*, has been under investigation at the *Drosophila* Research Laboratory of the University of Utah. This head abnormality was given the name *tumorous head*. The trait was first discovered in 1945 at the University of Texas in a sample of a wild population which had originally been collected at Acahuizotla, Mexico, in 1941. The tumorous head stock has been inbred at the University of Utah since the fall of 1946. The inbred stock shows an average penetrance of approximately 70 per cent at 21°C. The inheritance of the trait is controlled by a genetic mechanism involving a sex-linked recessive gene, *tu-1*, and a third chromosome semi-dominant gene, *tu-3* (Gardner and Woolf, 1949). The wide variability of expression of this trait in the adult fly has been described (Newby, 1949). The abnormalities form a series ranging in size from very small, inconspicuous ones to large, massive ones involving large parts of the head. The growths, as found in the adult, are usually unilateral; however, if bilateral growths occur they are never symmetrical. This indicates that the growths develop during the early stages of morphogenesis when the adult head primordia are paired structures, and not during the later stages when the primordia fuse.

It was found that no significant growth of the head primordia occurs in either the tumorous head stock or the normal stock during the first 16 hours of larval development. A doubling of the number of nuclei takes place between 16 and 24 hours and another doubling between 24 and 32 hours. In the antenna primordia no significant number of cell divisions occur during the first 32 hours, but in the eye primordia many cell divisions were noted during the same period.

It was difficult to observe any recognizable differences in growth rates or growth patterns of the adult head primordia between the tumorous head stock and the normal stock during the first 24 hours of larval development. However, at the 32-hour stage of larval

development abnormal morphological traits were found in the tumorous head stock which were not observable in the normal stock.

From this investigation of the growth of the head primordia in *Drosophila melanogaster*, it is evident that the growth of the cephalic discs in Canton-S and tumorous head larvae is remarkably similar. During the first 32 hours of larval development, the growth of all the components of the cephalic discs follows a parallel course in Canton-S and tumorous head. It is not possible to discover any differences in the developmental pattern in tumorous head as compared to Canton-S when the growth rate is used as the criterion. In the morphological studies, variations were observed in individual optic discs of the 32-hour tumorous head larvae as compared with those of Canton-S. These morphological differences were observed in areas of the ventral portions of tumorous head optic discs and appeared as protuberances bulging from the surrounding disc tissue. Perhaps these bulges of optic disc tissue are the primordia of the abnormal growths observed in many manifestations in the adult tumorous head. These protuberances may be the first indications of the effect of the two genes. From a study of the growth curves, it is evident that the abnormal bulges are developed from the reservoir of cells which normally would develop into eye tissue or head tissue. The results of this study indicate that the determination of the abnormal growths in the tumorous head imaginal tissue is a local effect, the growth pattern of the abnormality not affecting the growth rate of the tumorous head cephalic discs and components during the first 32 hours of larval development.

Another observation of this study was that in the first 16-hour larval period of development the imaginal cephalic disc cells grow mainly in size rather than in number. The accepted view is that imaginal disc cells grow by an increase in number, not in size.

This study of the first 32 hours of development has indicated that further investigation will be required to elucidate the problem of the origin of the head primordia during embryonic development and the morphogenesis of the head abnormalities beyond the 32-hour stage of larval development.

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## A PRELIMINARY REPORT ON THE HELMINTH PARASITES OF NORTHERN MINNESOTA

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