they were transplanted to nursery rows and their further development will be followed this coming spring.

As the vegetative growing point consists of many cells and as only a certain number divide simultaneously even under most advantageous conditions, treatments to influence the fertilized egg or the embryo in its initial stages of development should be more promising than the methods just outlined. With this in view, flowers that had opened the day before and also those of an earlier date of anthesis were treated with colchicine. In one set of experiments the flowers were painted over with colchicine agar, while in another set of treatments, lateral branches of the floral axis from which all unopened flowers had been removed were immersed in test tubes of colchicine solution of one-half and one percent strength, respectively. The length of treatment in the immersion experiment varied from one-half hour to four hours. To keep the agar from drying out too rapidly the treated branches were enclosed in parchment bags for a period of 24 hours. The treated material was left on the plants until harvest time. Each lot was collected separately and planted out in nursery rows during July and August. The development of the young seedlings was followed and all plants that appeared from a study of the lower leaf epidermis to be normal were discarded.

It is a well-known fact that plants with a higher chromosome number have larger stomates, and, since it is time-consuming to make a cytological analysis of all individuals, circumstantial evidence gained from a study of the leaf epidermis is sufficient for making preliminary discards. The leaf epidermis is easily stripped and the length of the stomate measured with an ocular micrometer. By this method about 10,000 seedlings were examined in the course of the summer. All plants with stomates measuring less than 35 microns were discarded and individual records were kept of those remaining in the nursery rows. The plants were tested again after an interval of two months and those that had reverted back to normal were removed. In this manner the number of actual or potential "takes" was narrowed down with final eliminations to be made on actual cytological examination of young floral branches when they appear.

NUCLEAR PHENOMENA IN THE POLLEN TUBE OF SUGAR BEETS

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Pollen tubes that have developed on nutrient agar are broader than those that grow in the tissue of the style of the beet flower. This fact has been studied in other plants by Wulff (3) [1] who found in certain cases that tubes in culture were from five to six times as broad as those in the style. However, other investigators found no difference in appearance of pollen tubes and their nuclei in artificial and natural media.

Sperm nuclei first appear in the pollen tubes of the sugar beet developing on artificial media after the tubes have attained a length of about 50 microns or approximately the combined diameter of two or three pollen grains. The sperms are not always found close to each other and their position relative to the distal end of the tube also varies. The two sperms are easily recognized. Their shape varies from that of a spindle or shallow crescent to that of a sphere. When emerging from the pollen grain they are practically always elongate but may become round later on. Occasionally extra sperm-like bodies,

1/ Numbers in parenthoses refer to Literature Cited.

probably resulting from a division of one or both of the sperms while in the pollen tube, have been observed.

The tube nucleus is usually wanting. Its shape in the mature pollen grain is already more or less abnormal, and the degenerative processes are usually completed before the pollen grain germinates. One sees occasionally faintly-staining hollow spheres reminiscent of the degenerating tube nucleus, but these structures are often fixation images of some of the abundant plasmic content of the pollen tube. Earlier studies by the author (1) and observations by Oksijuk (2) showed the presence of a tube nucleus some distance beyond the sperms in pollen tubes growing in the tissue of the style. More recent observations by the author point to the fact that the vegetative nucleus, especially in tubes developing on artificial media, is usually lacking. Degeneration of the tube nucleus and its absence from the pollen tube is not uncommon in other plants and its occurrence in sugar beets is of little significance.

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A COMPARISON OF THREE METHODS OF HARVESTING SUGAR BEET PLOTS

A. W. Skuderna 1/

In plot experiments with sugar beets, it is customary practice with many research workers to weigh as far as practicable all of the beets from the plots for determination of yield. Some investigators remove border rows to reduce border effect, while others ignore it. Some add refinement to the method of plot harvest by harvesting only normally competitive beets. Others endeavor to correct for variations in stand by various means, such as reducing the plot yields to an acre basis using the percent stand as one of the factors in the conversion. Others use the covariance method in adjusting yield to stand, or resort to some other statistical treatment of data calculated to give proper weight to variations in stand so that a valid estimate of yield and its accompanying standard error may be obtained.

There is considerable confusion as to the proper method of harvest to employ. This arises, no doubt, from the fact that no one method of plot harvest will satisfy all conditions. Thus, it has been held by some that

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