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environmental factors, namely, soil moisture, relative proportion of mineral nutrients, temperature and length of day period, that may influence the development of tomato pockets has been made. A large amount of data has accumulated. These data represent a study of each individual plant, as to its daily and total transpiration rate and water requirement, and also, a study of the effects of sudden increases or decreases in soil moisture. The effects of sudden changes in temperature and in evaporation capacity of the air have also been studied. The detailed data are too extensive to present in tabular form in a résumé, so a summary of the major results is given.

The most important conditions within the plant and the associated factors that appeared to contribute to the pocketing of tomato fruits in these studies may be classified in three groups and are as follows:

(1) *No fertilization of ovules or typical parthenocarp.* It should be recognized that the culture of tomatoes in the greenhouse under variable environmental conditions offers ideal conditions for producing pocketing of the fruit. Under ordinary circumstances pollen distribution is poor, but this was largely overcome by frequent agitation of the plants, by handling them in weighing to correct for water loss, in tagging the blossoms as they opened, in the tying of the plants to the stakes and in the taking of notes. In addition, the most prominent factors that contribute to sterility and parthenocarp may be briefly noted: (a) abnormally long styles, a result of high temperatures; (b) slow germination of pollen tube, a result of low temperature; (c) slow growth rate of pollen tube, due to low temperature; (d) pollen abortion, due to low carbohydrate reserve, caused by high nitrogen, high soil moisture, high temperature and short-day light period; (e) ovule or embryo abortion, due to low nitrogen reserve, a result of low nitrogen, high soil moisture, high temperature and short-day light period. In these studies the many factors enumerated contributed strikingly to the development of pocketed fruit, especially when the plants were grown in the high and low temperature greenhouse units and when large amounts of nitrogen were applied.

(2) *Ovule of embryo abortion after normal fertilization.* The saturation or supersaturation of the soil appeared to cause marked changes in the normal metabolic, respiratory and transpiration activities of the plant, which in turn resulted in ovule or embryo abortion. Also, excessive drouth, accompanied by high transpiration, a condition that apparently results in endoxerosis, caused marked apparent changes in normal metabolic, respiratory and transpiration activities, and resulted in ovule and embryo abortion and the development of pockets.

(3) *Necrosis of vascular and placental tissue after*

fruit growth is well developed. During any period of the growth of the plant, the saturation or supersaturation of the soil apparently stops almost entirely all transpiration; causes marked changes in color, the plants becoming chlorotic; and also interferes with the normal metabolic activities. These conditions apparently contribute largely to the appearance of necrosis of the vascular and placental tissues, which in turn leads to the development of pockets of the fruit of any age. Low soil moisture accompanied by high transpiration results in endoxerosis of the vascular and placental tissues. Sudden changes from optimum or high soil moisture to low soil moisture, accompanied by excessive transpiration, appeared to be the most drastic treatment of all that favored the development of pockets.

In these studies we are dealing with an environmental complex of many factors, as, for instance, soil moisture, soil nutrition, air temperature, light duration and the interrelation and interaction of these component factors, any one of which may become a limiting factor to normal plant growth, metabolic and respiratory activity, and thereby interfere with the normal development of tomato fruits. There is considerable suggested evidence that large amounts of superphosphate and only moderate amounts of nitrogen in the fertilizer reduce pockets by giving a nutritional balance conducive to more nearly normal seed development. The factors that can be observed and measured appear to bring about a general disturbance of the metabolism of the plant, causing a condition of suboxidation or endoxerosis; to affect the CO_2 and O_2 exchange, which, in turn, apparently leads to a visible necrosis of the vascular and placental tissues, thereby affecting ovule and embryo and placental development and normal fruit growth.

A more detailed report of this work is being prepared for publication at an early date.

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