TENTATIVE CLASSIFICATION OF SYMPTOMATIC TYPES OF "TOMATO POCKETS"

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(With five figures)

It is conservatively estimated by prominent tomato growers and shippers in Texas that annually more than 15 per cent. of the Texas tomato crop is lost due to a condition commonly known as "Tomato Pops," or "Tomato Puffs." The trouble is serious in all the Southern States. At present the cause or causes of this abnormal condition are unknown, presenting a challenge to the Experiment Station worker in the South. The present paper is presented in order to bring this fruitful field for research to the attention of workers generally.

Fig. 1. Marglobe, fruit with orange-yellow exterior; symptomatic type A; marketable before edema-like symptoms develop.

Method of attack

During the season 1928, as a part of the general subject of quality in fruits, experiments were initiated at the Texas Station with the object of determining the cause or causes of this abnormal condition of tomato fruits. Although these experiments are in progress it is desirable that the problem receive attention also at other Stations since it concerns all the Southern States, California, Mexico and the Caribbean Isles. Greenhouse tomato growers in the North may also be interested. The method of attack includes a consideration of (a) the morphology and physiology of the dis-

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eased fruit; \(^3\) (b) the possible causal correlation between this abnormal condition and virus infection; \(^4\) (c) the temperature, moisture and humidity factors, and (d) other factors, such as pollination, light, soil solution, etc., singly and in combination.

Lesley and Rosa (2) state that one self-fertilized line was observed which produced a much larger proportion of soft and "puffy" fruits than the parent. Breeding for resistance should apparently be given consideration as a possible method of solving the problem.

**Classification of types**

The work as outlined is a cooperative undertaking in which many are taking part, and for this reason it was considered advisable to present a preliminary classification of the types of symptoms encountered, for the convenience of those engaged on separate phases of the research. In July, 1928, at Texas Substation no. 2, Troup, over 5,000 diseased fruits were examined. The apparently distinct symptomatic types of the disease observed are portrayed in figs. 1 to 5, inclusive. There is apparently a gradual gradation from one type to another, but for practical reasons four types have been named.

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\(^3\) Prof. F. S. Jamison is engaged on this problem.

\(^4\) Drs. J. J. Taubenhaus, and W. N. Ezekiel, and Mr. W. H. Friend are cooperating on this phase of the problem.
Aside from the possible importance of severity of attack, the symptoms apparently depend upon the stage of development of the fruit when it becomes subject to the disease:

(a). When the fruits are quite mature at the time of becoming subject to this condition they are apparently characterized by senescence of vascular bundles in the fruit, showing as white areas. The development of the ectocarp apparently is retarded in development impeding the normal formation of lycopin. As a result, the fruit is of an orange color on the outside. At an advanced stage in the development of the fruit, the placental tissue and sometimes the meso- and endo-carpal tissues in the interior of the fruit mature almost normally, and the fruit becomes 'dead ripe' when the ecto-carpal tissue is still in a yellow condition. This results in a watery interior similar to edema or dropsy. See fig. 1, symptomatic type A. This type was observed in only a limited number of cases, and is marketable before edema-like symptoms develop.
(b). Fruits affected at an earlier stage of their development apparently show large areas of opaque, degenerated tissue in the center of the fruit conspicuous as white areas radiating outward in the locular walls and placentae. See fig. 2, symptomatic type B. This type is marketable.

(c). Fruits affected at a still earlier stage of their development are apparently characterized by marked contraction of tissues, especially pla-

![Fig. 4. Gulf State Market; green fruit; symptomatic type C; not marketable.](image)
Fig. 5. Marglobe, green fruit; symptomatic type D; not marketable.
(d). Fruits affected at a very early stage are apparently characterized by total absence of seeds or reduction in number; in extreme cases, with total absence of seeds, the fruit is wholly vegetative resembling a dwarfed "witches broom." Most fruit of this type observed were small in size, but medium sized and even large specimens were observed. See fig. 5, symptomatic type D. This type is not marketable.

It should be realized, however, that this classification is merely suggestive and tentative, and that the occurrence of the last named, and possibly each of the four types may be due to different causes. Only further experimentation can settle these points.

Nomenclature

In recognition of the fact that the outstanding symptom of the typical diseased fruit, symptomatic type C, is the presence of an "open space" or "pocket" in the locules, and that there is no distention but rather a contraction of tissues, the name "Tomato Pockets" is proposed in preference to the less descriptive terms, "Puffiness" (2); "Hollow Tomato" (1); "Puffy Tomato" (4); "Puffing" (3) and "Tomato Pops" or "Tomato Puffs," (local Texas terms).

Summary

1. The subjects under investigation concerning the problem of "Tomato Pockets" are outlined.
2. A tentative classification of symptomatic types, A, B, C, and D, of the abnormal condition is presented.
3. Reasons are advanced for the acceptance of the proposed descriptive term "Tomato Pockets" in preference to less descriptive local terms.

LITERATURE CITED

1. Friend, W. H. (Private communication, July 30, 1928, on observation of "Hollow Tomato" at Texas Substation no. 2, Troup, in 1921.)