

NOTES ON THE NATIVE SEEDLESS PERSIMMON.

(Preliminary Report.)

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In the vicinity of Indiana University there are a number of persimmon trees (*Diospyros Virginiana L.*) which during the year 1908 bore large numbers of seedless fruits. No single tree, however, was found which bore only seedless berries, while four or five bore fruits nearly all of which contained seeds. The size of the seedless berries, their distribution on the tree, the time of ripening and their flavor as compared with those containing seeds was noted. A preliminary study of the embryology of the persimmon was also made. Entire ovaries were fixed in chromic-acetic acid and embedded in paraffin for sectioning, and later as the ovaries hardened ovules were similarly prepared. As later developments showed, the material was taken from a part of the tree which bore for the most part seedless berries, so that the development of the embryo was not observed. This led to a careful observation of the distribution of the seedless persimmons on the tree.

As the persimmons matured it was noted that the lowest branches of the tree from which the material was collected bore mostly seedless fruits, while somewhat higher were a few with seeds, and in the top of the tree the majority contained seeds. The seedless fruits on this tree were somewhat smaller than those containing seeds. Another tree younger than the one just mentioned bore throughout the branches berries with and without seeds, although more seedless below than above. On this latter tree there were many seedless fruits quite as large as the others.

The following questions naturally arise: Why did one tree produce persimmons on the lowest branches which were practically all seedless, while the majority on the upper part produced seeds? Did fertilization depend on the transfer of pollen from some other tree bearing only staminate flowers, since all the flowers examined contained sterile stamens, but these were from a part of the tree which bore only seedless berries? Or were there perfect flowers present which produced all the fruits containing

seeds? Is pollination necessary for the production of a well-flavored and good-sized fruit? Is the absence of mature seeds due only to the lack of fertilization?

In regard to the first question observations have been made which answer it only in part. At the time of flowering, which occurs about the last of May and the first of June, ovules were prepared for sectioning from the lower part of the first tree already referred to. No difference was noted among the flowers, although those in the upper part of the tree were not examined. The flowers from the lower part so far as noted bore a well-developed pistil but sterile stamens. Sections through the ovaries of these flowers showed occasionally a well developed embryo sac, but in some instances complete embryo sacs were not observed. Quite often the antipodal cells, part of the egg apparatus or the polar nuclei seemed to be lacking. Difficulties in staining due to the presence of tannin in certain parts of the ovary may have been responsible for this apparent condition. The polar nuclei were found several times in an early state of fusion, but further than this there were no evidences of endosperm or embryonal development in any part of the embryo sac. The contents disorganize and small aborted seeds which often occur seemed to be due merely to a slight growth of the integuments. There were no evidences noted of either fertilization or pollination having taken place.

As regards the transfer of pollen from staminate trees, the latter are not known to exist within three or four miles of the tree in question. Whether bees carry pollen to this tree from a distance has not been observed. If the tree bears in part perfect flowers, which has not yet been determined, this may account for the production of seeds in some fruits and not in others. The flowers so far as examined contained only sterile stamens. If no perfect flowers are present the question as to the absence of seeds being due to the lack of fertilization becomes of some import.

While the seedless berries on this tree were nearly all small, on a second tree seedless fruits were found quite as large as the others, the flavor in each case being quite as good if not better, since the seedless fruits as a rule have less of the astringent quality so characteristic of most persimmons until thoroughly ripe and which often persists even then. Whether the large size of the persimmon with seeds is due to the influence of fertilization or to some native quality of the pistillate flower has not been discovered.

The Industrialist (No. 20, March, 1904, Kansas State Agricultural

College) figures and describes imperfect staminate flowers as borne on separate trees from those bearing perfect flowers. Among the perfect flowers on the same tree are sometimes borne imperfect pistillate flowers. From the perfect flowers and the imperfect pistillate flowers similar fruits ripened, but no occurrence of seedless fruits was noted. Purdue University Agricultural Experiment Station Bulletin No. 60 reports two or three varieties of seedless persimmons which had been sent into the station.

A second tree already referred to bore mainly seedless fruits. In the upper part of the tree about 75% of the persimmons and in the lower part probably about 80% were seedless. Sometimes an entire picking (the fruits do not all ripen at the same time) would be seedless. These persimmons were excellently flavored, of a good size, and usually ripened earlier than those with seeds. The seedless, however, do not always ripen earlier, for some of the greenest on the tree, after ripening had begun, were found to be seedless. On the other hand, the earliest ripe were always seedless, one having been found on August 20th ripe and well flavored but rather small.

