Proceedings of the Iowa Academy of Science

Volume 24 | Annual Issue Article 60

1917

Influence of Orchard Soil Management on Fruit Bud Development and Formation as Found in the Apple

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INFLUENCE OF ORCHARD SOIL MANAGEMENT ON FRUIT BUD DEVELOPMENT AND FORMATION AS FOUND IN THE APPLE.

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Since this is merely a progress report on fruit bud development, it is impossible to draw definite conclusions, as insufficient data have been compiled.

The chief object of orcharding is the production of the largest possible amount of high class fruit. Since the development of fruit really starts with the development of the fruit bud, the production of high grade fruit depends on the development of the fruit buds. Therefore it would be important to determine what influence the different methods of soil management would have on fruit bud formation and development.

This problem deals with the morphological structure of the apple fruit bud as found in its development from the time of the leaf and flower bud differentiation until the opening of the flowers. The buds studied were from six trees each, of two varieties; Grimes Golden and Jonathan, which are located in the state Experiment Orchard at Council Bluffs, Iowa.

These trees were grown under four orchard cultural conditions, namely white sweet clover sod, cover crop, blue grass sod, and clean tillage, with two trees of each variety serving as checks in the two first named conditions.

The methods followed included taking ten buds from each tree at intervals of about two weeks from July 6, 1916, till blossoming time in 1917. The buds were fixed and imbedded according to the recommendations of A. W. Drinkard, Jr.,[1] except for a few minor changes. It was found that collodion could be eliminated and the buds successfully sectioned when imbedded in hard paraffin by keeping the buds in a ten per cent alcoholic glycerine solution for twenty-four hours to soften the tissue and infiltrating in an oven in which the temperature was not allowed to rise over two degrees C. above the temperature of the paraffin used.

[1]Drinkard, A. W., Jr., Fruit Bud Formation and Development: Annual Report Va. Polytechnic Institute Agr. Exp. Sta., 1909.

Over one thousand permanent slides have been prepared which contain only longitudinal median sections of as many terminal buds of the apple cyme.

To date, the results are rather indefinite, as all material and data have not been studied. A few of the most important facts follow.

Flower and leaf buds started to differentiate as early as July 1 and continued to differentiate till September 15, but by far the largest percentage started to form between July 20 and August 10.

The fruit bud formation is closely correlated with the growth of the trees. This showed up strongly in the Jonathan, for flower buds became differentiated on July 1 on a tree that had a diameter increase of .218 inch while on the tree of the largest growth with .517 inch diameter increase the flowers did not form till September 8.

Buds from the same type of spurs were found to show over a month difference in time of development and those borne terminally on long wood growth were found in some cases to be two months behind the flowers on the spurs of the same tree.

From the material so far studied the order of the time of flower bud differentiation or start of formation is as follows:

JONATHAN:	GRIMES GOLDEN:
Clover sod.	Clover sod.
Blue grass sod.	Blue grass sod.
Clover sod.	Clover sod.
Cover crop.	Cover crop.
Clean tillage.	Clean tillage.
Cover crop.	

The clover sod plot at the top of the Jonathan list was far ahead of the next four plots and the last cover crop was a month behind the clean tillage.

In the Grimes Golden the time of the flower formation was much shorter. The clover sod and blue grass sod were very close together while the next two, namely the cover crop and clover sod, were almost even. The clean tillage was about a week behind.

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