SOD MULCH SOMETIMES A SUCCESS.

SUMMARIZED BY
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FROM BULLETIN BY
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†Riverhead, N. Y. §Connected with Grape Culture Investigations. **Connected with Hop Culture Investigations; absent on leave.
Tillage usually best practice in orchards. A test reported in Bulletin No. 314 of this Station appears to prove quite conclusively that, for apple orchards in New York State, on most soils and in nearly all situations the tillage-and-cover-crop system is superior to the sod-mulch method of handling the soil. In the work now reported, the results of another test show that, under some rather uncommon conditions, the sod-mulch method may give fruit better adapted to certain market demands, and a larger yield, at less expense. But the situations where these conditions are likely to be met are so few that orchards succeeding in them must be considered "exceptions that prove the rule," "Tillage is best."

Hitchings orchard selected for tests. Probably best known among the representatives of sod-mulch systems in New York State is one among the hills of Onondaga County, southwest of Syracuse. In this orchard was developed the "Hitchings method" of sod mulching, named from the owner of the orchard and originator of the method, Mr. Grant Hitchings, who has united with the sod mulch other original ways of dealing with his trees and fruit, so that his orchards stand for much that is "different" in fruit culture. This farm, as the home of the simplest method of sod mulching, was selected by the Station ten years ago, as a most appropriate place to locate a comparative test of the two strongly contrasted ways of handling orchard soils.

Description of plats. Three plats were selected for the purposes of the test. A, the largest, is on the comparatively level floor of a valley, at the foot of a rather steep hill on whose slopes lie B and C, the other plats. In A, the trees, two years set when the experiment began, are R. I. Greening and Sutton in alternate rows. Each section — tilled and sod mulch — of this plat, contains nearly two acres.

*This is a brief review of Bulletin No. 375 of this Station on Tillage and Sod Mulch in the Hitchings Orchard, by U. P. Hedrick. Anyone interested in the detailed account of the investigations will be furnished, on application, with a copy of the complete bulletin, so long as these are available.

Names of those who so request will be placed on the Station mailing list to receive future bulletins, popular or complete, as desired.
In B, each section, with an area of almost an acre, contains one row of each of three varieties, Alexander, Wealthy and Fameuse, the trees being nine years old when the test began. The smallest plat of the three and highest in elevation is C, containing six rows of Northern Spy trees, set one year before the trees in B. The area of each section in this plat is but little more than a quarter of an acre.

The soil in the three plats belongs to the Miami series, ranging from the dark brown, rather tenacious clay loam of the valley floor; moderate in depth, to a deeper soil with more and more stones in the loam, and with some gravelly or sandy spots as the elevation increases in B and C. In all three plats the soil is well supplied with the usual elements of fertility, though somewhat deficient in lime. In B and C the surface of the land is somewhat uneven and the soil, in both depth and character, varies too much to make these plats very suitable for experimental work. "But better plats could not be laid out in the Hitchings orchard and it was much desired that comparison of sod mulch and tillage be made where the mulch system had become most prominent in New York." The general plan of the experiment was outlined at the Station, but the operations were left to Mr. Hitchings' judgment and most of the records were kept by him, as the location is rather inconvenient for frequent visits by Station men.

**Culture.**

The trees were in sod when the experiment began, those in Plat A having been set in sod; and the grass roots have been left undisturbed throughout the ten years on the sod-mulch sections. Once each summer, or twice if necessary, the grass was mowed, and usually left to lie where it fell, to form the mulch. In A, part of the grass was cured for hay the first year and removed, the rest being piled about the trees to cover the area through which the roots spread. In subsequent seasons all the grass was thus placed above the roots of the trees in this plat; and the same plan was followed in B and C for two or three years, after which the grass mulch was left undisturbed, as Mr. Hitchings believed the roots had then met between the rows of trees.

In the tillage section the land was plowed in late April or early May each year, cultivated from seven to twelve times during the summer, with special hoeing or spading about the trees as the owner thought advisable. In one season the trees in one section were hoed five times. In every year but one a cover crop was sowed about August 1. This was usually of mammoth clover or crimson clover but wheat was used twice. This cover crop was turned down the next spring.

**Results on fruit.**

Disappointment followed disappointment on Plat A; for a severe winter at the outset killed several trees and undoubtedly lowered the vitality of many others. Because of this, or, more probably, because the valley
soil and conditions are not well adapted to apple-growing, all of the trees were slow in maturing. When a crop was promised, by a good show of blossoms, untimely frosts or unseasonably cold weather at blooming time destroyed the prospect, so that in the whole ten years only scattering fruits were harvested on this plat. Here, tree-growth alone must be depended on for information as to the effect of the two methods; though this plat, by size, uniformity of soil and conditions, and arrangement of varieties, was considered most promising of all.

On the B and C plats, on older trees, some apples have been produced every year, and in a few seasons the yields have been excellent, for trees of this age. On these two plats, with four varieties, the trees in sod have yielded more fruit in twenty-five instances, those in tilled soil more in thirteen cases, while on two occasions the trees of one variety produced the same amount on each plat. With each variety the average annual yield of trees in sod was greater than that of those under tillage; but the differences were small, ranging from less than a peck with Northern Spy to a bushel and three-quarters with Fameuse.

The fruit on the tilled sections was not as well colored as on sod, and was, for this reason, less desirable for market purposes, especially for a local or semi-private trade such as Mr. Hitchings has developed. The money value of this difference, however, would be hard to fix; and when we consider that high color is most frequently an index of lack of vigor in the trees bearing such fruit we must not place an exaggerated value on this characteristic.

No constant difference in size of fruits grown by the two methods could be distinguished; but in many cases it was quite evident that the increased quantity of apples from the trees in sod was due to greater numbers rather than to larger size.

**Effect on trees and foliage.**

The fruit yields on two plats apparently show the sod-mulch method better, but tree growth indicates very little difference on these plats and color of foliage shows greater vigor in the tilled trees. On Plat B, Fameuse trees in sod made an average gain in tree diameter, during the ten years, of .89 inch more than those under tillage, while Wealthy trees reversed this showing with an increased gain of .73 inch for the tilled trees. On Plat C, Northern Spy trees made almost identically the same gain under the two methods.

In no case, with these varieties on B and C, was the foliage better on the trees in sod and was as good only early in the season or after heavy rains. At all other times the tilled trees showed a darker green in their foliage; and in four seasons when observations were made they held the foliage longer in the fall. On A, with the younger trees, these foliage differences were much more noticeable and at
times striking, thus showing clearly the greater vigor of the trees on tilled soil. On this plat, tree diameters confirmed the evidence of the foliage; for both Greening and Sutton trees on the tilled section were more than an inch greater in diameter than those on sod, the Suttons nearly an inch and a quarter greater. These are considerable differences for trees of this age, and can not be considered as accidental, since 150 trees were measured.

These figures plainly show greater vigor for tilled trees on this plat while on the other plats no such difference appeared. How is this to be explained? First, the soil on the hillside is deeper than that in the valley and gives the trees a larger feeding area so that the roots can get away from the grass; and, second, on the hillside there is an almost constant seepage of water from higher up the slope, which affords an abundance of moisture for both trees and grass. In the comparatively shallow and dry soil of the valley the trees in sod can not compete successfully with the grass for either water or food, and therefore suffer.

Expense. With crop yields favoring the sod mulch under these conditions, the exact cost of production is not needed to prove it the better method in this orchard, for it is quite evidently cheaper to leave land in sod than to till it. It is well that the case is so plain, for it would be hard to reach a fair average for the cost of cultivation from the data secured in these tests. The plats were so small that the expense of handling them as units was greatly increased; and it is doubtful whether many orchards would require, or at least receive, as many cultivations during the season as were given the tilled sections of these plats. In brief, however, the cost of cultivation in A, the large plat in the valley, was $11.22 per acre annually; in B, the second plat in size, at the base of the hillside, $13.30, and in C, the small plat well up the slope on steeper grades, was $24.33 per acre. The cost of mowing the grass averaged 72 cents an acre.

Other considerations. The relative cost of the two methods, even were crops equal, makes sod mulch better for Mr. Hitchings; and he finds other advantages. Under his method of harvesting, which is to allow many of the varieties to ripen on the tree and drop, or to shake them off, the exposed dirt under the tilled trees is decidedly objectionable, as it bruises and soils the fruit. This, with the poorer color of the red varieties under tillage, makes apples thus handled less acceptable in market.

Where is sod mulch applicable? From the behavior of the Hitchings orchards, New York apple-growers may infer that there are particular places, soils and economic conditions under which the Hitchings method of sod-mulching apple trees may be used advantageously. Since the prerequisites for the success of the method, as indicated by the Auchter and Hitchings orchards, are not very generally found in this State, the
situations in which sod may be given preference over tillage should be set forth with exactitude.

1st. *Orchards on steep hillsides where land would wash badly under tillage may be kept in sod.*—There are few commercial apple orchards in New York in which cultivation may not be so managed that soil erosion will not interfere seriously with the tillage-and-cover-crop system. It is probable that clover or some other legume might be substituted advantageously for the blue grass and orchard grass of the Hitchings method where sod is desired to keep water from wearing the land away.

2d. *Land covered with rocks, whether steep or not, must often be kept in sod because of the impossibility of tilling.*—There are not a few such orchards in New York.

3d. *The Hitchings method is best suited to soils having considerable depth.*—It is adapted only to soils in which grass roots and tree root do not come in too intimate contact and too direct competition for food and moisture. The commercial apple orchards of New York are at present on lands the top soil of which averages less than a foot in depth. On these shallow soils the Hitchings method will prove a failure.

4th. *Soils must be retentive of moisture.*—To sustain trees at their best under the Hitchings method, soils must not only be deep but must be very retentive of moisture, or have the water table comparatively close to the root run of the trees, or, as in the case of the orchards under discussion, must be fed by seepage from higher ground nearby. On land that suffers from summer drouths, this sod-mulch treatment will almost certainly prove less beneficial to trees than tillage.

5th. *Economic conditions may decide the choice between tillage and some mulching treatment.*—The cost of caring for a sodded orchard is materially less, under this mode of mulching at least, than by tillage. If, then, a man chooses to grow apples extensively, rather than intensively, he may make larger acreage in sod counterbalance greater production under tillage thereby bringing the cost of production to the same level.

**The lesson of the Hitchings orchard.**

The chief lesson taught by the Hitchings orchard, with its unique features, is that a man may break away from the common practice, when circumstances render such practices difficult or impossible, and yet attain a high degree of success. The method of orcharding which takes its name from the Hitchings orchard is not as valuable to the fruit-growers of New York as is the demonstration by Mr. Hitchings that new paths to success may be blazed—new practices devised to meet new conditions, old obstacles overcome in new ways. It is a splendid and successful example of resourceful pioneering and of persistent endeavor to attain the highest success. The pith and the point of the work in this orchard, so different from
other orchards in the State, is that fruit-growing is intensely individual. The prime factor is the man.

But from the success of Mr. Hitchings the apple-grower must not be led away from the general truth, that the individual problem can be solved most often by the rational application of the laws of nutrition and growth which plants generally follow. Applied to the problem of growing apples in New York, the general law is, that the apple, like other orchard, field and garden plants, responds to cultivation.