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Thesis.

## Pruning of Frost Bittor Peach Trees.

by

Clift T• Alusti:
Class of '9y.

Michigan Agricultural Collcge,

Agricurtural Cullogo, iijchigain.

## A number of $t$ imes the peach trees of Vichigan have been bady

 injured by the frost, and many mothods of pruning have bcen tried. Mr. Hanford, of Indiana, said that in the cold winter of 1856 he had an orchard of thrifty youns trees absolutely killed to the snow line, and of course a total loss as far as appearances indicated or experience could suggest. Knowing, however, that the trees had been vigorous, and that thoir roots must possess considerable power of reproduciion, he procesdod to cut off the entire top of every tree that had been killed, and left nothing wut unsightly stumps througiout the orchard. The spring came on; advanced somewhat; he watched his sturms with anxiety; found that numerous buds started out from these stubs, put for th their shoots and made a remarkable growth, and in two years he had as good and healthy an orchard as that which had been cut of $f$ by frost. Since that time he had frequently the occasion to treat other trees in similar manner, some times cutting off injured branches only, and had almost uniformly had good results. But it is necessary to out off the injured branchos of frozen tops as early as possible after the snow 15 gone, and always before the sap has begin to ascend the tree.Mr. T. T. Lyon said his experience had taught him during the cold winter of 1873 , to take vigorous measures with trees that have been seriously injured by cold. The discoloration of the bark was only the indication of injury to the tree, and if the sap 93808
vessels are too much muptured the tree will die. The only remedy, and one whicl will be efficient if there is any vitality left in the tree, is a thorough pruring early in the spring.

Suggestions as to the treatmont of trees frozen by the cold snap of 1899, were given by many of the leaders in horticulture. Prof. W. J. Green of the Wooster, Ohio, Experiment Station, issued early in Marah, a press bulletin. He said, in the beginning, that a frozen branch is of no use to the tree, and the best thing that can be done is to remove all parts that are seriously effected. The questions which naturally ariso are "When should pruning be done and how much of the top shall be removed?" It is well to wait until it is possible to determine avoit how unch injury has been done, as shown by the discolored wood and shriveled barn. Usually one warm spell is a sufficient length of time to wait, but it is possible to defer the work too long, as the frozen wood seems to have a deleterious effect upon the sound parts, if not renoved before growtin commerices. During March, and in some cases even as late as April, the pruning should be done.

The peach ought to be pruned more severely than merely to remove infured rood, excert where they are killed to the snow line, and in such a case it is doubtful if they can be saved at all. Peach trees that are from three to five years old and have never been pruned to any extent need special attention. In case the injury to such trees does not extend beyond the twigs and
small branches, the best thing that can de dono is to cut off all the branches to within one to three feet of the body of the tree. A tree five ycars old, which has been allowed to grow at will, may have long, slender branches, six to ten feet in length, with most of the fruit-Dearing wood near the extremities. Such a tree needs topping, even if a crop has been sacrificed in order to get it into proper shape. To cut out half the top from such a tree Will improve succeeding crops and prolong the life of the tree. This puts the pruning upon a different basis. It is to be done not merely to remove dead wood, but to get the trees into shape for future usefulness. With this object in view the trees are to be so pruned that they can carry the next crop of fruit without breaking down. Of course it will be necessary to cut off limbs of considerable size, in many cases, and it will not be possible to avoid naked stubs. This can be remedied the next season, however, at Which time surplus branches may be removed also. Incidentally, it should be stated that some cutting back is necessary each season, in order to keep the trees in proper form. This method of pruning trees has so many advantages, that the loss of this season's crop will really prove to be a blessing to those who take advantage of the present opportunity to get trees into proper shape. In case of young trees which have been planted only one or two years, it may be found that the injury extends to the trunk and possibly to near the ground. If there is life above the bud the best thing to do
is to cut the entire top away as far as there appears to be injury, and start a new top. If cut off early in the soason, however, tho stump is apt to become dry, as shown by cracking. To prevent this the end should be covered with wax, or some material that will prevent the escape of moisture.

From Michigan we get the following as to the troatment of frozon trees. The trees in the different parts of the state were subjected to tenperatures ranging from fifte日ii to forty degrees below zero and, in many places, were severely injured if not killed outright. The zero weather during the recent freeze lasted so long that many of the old trees suffered as mach as others recently planted. In some cases, large cracks have formed in the bark upon large trees of all kinds, and in others, openings extend clear through the trees. More comnonly, however, the bark and wood are unbroken, but one or both are discolored. When discoloration is confincd to the wood, and especially if it is not very dark, the trees will live a number of years and may practically recover fram the effects of the freeze if properly handled, but usually their period of life will be much shortened. Where the inner bark has been much discolored, and certainly if it has become loosened from the tree, there will be little hope of saving it if a considerable area is involved, In some sections of state, the ground was covered with snow to the depth of from six to sixteen inches, and tho injury may not extend mich below the snow ine.

In such cases of trces not over four years old, where tho bark above the snow has become browned and loose from the trees, and where there is a space of six or eight inches of uninjured wood above the bud, the top can often be cut back and a sprout trained from the stub. When young trees have the tirs of the branches destroyed, or if they merely show serious injury, while the trunk is in good condition, it is advisable to head the trees back severely. Bearing peach trees, that have been allowed to grow With little or no hearing in, may be cut back so as to leave four or fivo arms, well distributed about the trunk, with a length of from one to three foet. When trees of this size are unpruned, the sap will have to pass for a long distance through the injured in order to reach the leaves and, as there will be a large nunber of buds from which shoots will develop, the reduced quantity of sap that will find its way to the growing points will result in a feeble growth and probably in the death of the trees. When the trees are headed back, the distance that the sap will have to pass will be much lessened aind, as only a few buds will remain, each W111 receive a much larger proportion of the sap and a much stronger growth wili be secured than winere trees are unpruned. A considerable number of shoots will start from these stubs, but before thoy have reached a length of toin or twolve inches, a part of them should be removed that those remaining will not be crowded and suffor from a lack of light and air. Treatod in this way, the
shoots will make a fimn growti and will much less likely to be injured by the cold of the following winter, than when all are allowed to grow, and in their own crowded condition, develop weak and watery shoots.

Then the bark has crackod and loosened from the wood over a small area, there is still a chance of saving the tree if the loose bark is cut away and tine wound is covered with grafting wax, or if grafting clay is bound upon it. The trees that have been most injured will soon begin to shrivel and may be removed at any time, but there is always a possibility that troes may prove less injured than they at first indicate, and too much haste in the removal of the trees might result in serious loss. When small trees are to be cut back to stubs near the ground, it is best to delay it until severe freezing weather is over, but if cutting back is put off too long the roots may be weakened. If it is sufficient to prurie back the tops of the trees, this can best be done during the month of April, as at that time it will be possible to see how much the wood has been killed back, and there will be less danger from the drying out of the ends of the stubs than would be the case were they headed back earlier.

The extreme cold of the winter just passed has been very disastrous to nearly all kinds of fruit and has done much damage to the tree themselves, yet in a way it has been a benefit for it gave opportunities of trying several important experinents in re-
gard to prunning frost bitten peach treer.
Veny early the trees gave evidence of having been badly frozen and it was determined if possible to answer the question about the different degrees of heading back; and also about the different times of doing the work during the spring.

The axperiment was somewhat limited on acoount of having only a limited mmber of trees; and also beosuse the final notes had to be taken before the trees oould mize maflioiont growth.

For the purpone of maring the experimont, the orchard was dirided into three blooks of nine trees enah with three trees in each row. 8ee table. April 14th 1899, the flrat three trees of bleak one, sew one, were pruned and hoaded back to one half of the provicas years eronth. The ams date, the plrst three trees of bloak two, row one, were pruned and headed baok nearly all of the provicas yeare couth and also at the ame time, the first three trees ofblact three, wow one, were prunce and headed clear bait to etribs, leaving onf a sow revis mhots.

Me9 8,1899, the socond praning was male. Inis was just as the bouds began to open. This time the socond three trees of bloos ane, ive two, wear prance and headed back, the same 28 Iow one, also the coond 2 ew of blooke two and thoe, were pruned and headed baot the aame ac row one of blooks two and throe.

Mor 16th,1899, the third and final pruninc was mado. The arowth now being fran one to three inohes lons. This time the
last three troes of block one, row three, were pmaned and headed back the same as row one and two, also the third rows of blocks two and three were pruned and headed back, the salle as rows one and two of blocks two and three.

Duplicates of this experiment were also made, and in all about seventy five trees were pruned.

Photographs were taken of the three methods of heading back, before the growth started, and also of the same trees, the same day the final notes were taken. The photograpins correspond to the block in their order one, two, and three.

The final notes were taken liay 29, 1899. The results were not very satisfactory, from the fact that the troes were so badly frozen, and the season so late that what trees did live had not made nuch growth.

The indications were, that the different degroes of heading back, did not make any material difference. The trees that were headed back to stubs, were making as good a growth, in proportion to their tops, as those trees which had only one half of the previous years growth removed. In some instances the growth on the stubbed trees, down closer to ground and upon larger limbs was much more vigorous.

As to the tine to prune could not as yot see any difference, only in the fact, that the trees pruned after the growth had made a good start, and all of the dead wood could be ranoved. In the
trees pruned earlier, all the dead limbs could not be removed, for they could not be told from the live ones. Thus the trees pruned later in the season would save a repruning in order to have all the dead limbs removed and trees left in proper condition.

The indications are at this time, that the trees were too severely frosted to survive the sumer. Some of the trees that appeared all right early in spring never leaved out, while many only made the growth sustained by the first flow of sap, and then withered and died. The one, two, and three year old trees seemed to stand the winter, but even they are in a condition which bespeaks little for the future thrift of the orchard

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Table continued．
Block III

Row I Ror II Row III
Apr． 14 May 2 May 16

Headed back to stubs．
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AN UNPRUNED TRIES


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BLOCK TWO BEFORE GROWTH STARTS




BLOCK THPEE AFTE GROWTH STARTS


A TREE PRUNED AFTER GROWTH. STARTS

