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Strawberry, Sand Cherry and Orchard Notes

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South Dakota Agricultural College

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Strawberry, Sand Cherry and Orchard Notes.

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THE STRAWBERRY.

CHARLES A. KEFFER, Horticulturist.

A careful study of the leading old varieties of the strawberry, as grown at this station during the past three years, leads to indications that are of interest to the farmers of the state, not because the indications suggest the successful cultivation of this delicious fruit, but because of their negative value, and because they illustrate one of the principal difficulties that our climate presents to the fruit grower.

The first plantation was made in the spring of 1888, and include the following varieties:

Cumberland, Wilson, Chas. Downing, Green Prolific, May King, Red Jacket, Sharpless, Glendale, Manchester, Countess, Windsor Chief, Crescent, Mt. Vernon, Captain Jack, Sucker State, Belmont, Indiana, Prince, Jumbo, Kentucky.

Arranged in the order of their *healthfulness* during the past three years, they would stand (1) Glendale, (2) Crescent, (3) Windsor and Mt. Vernon, (4) Captain Jack, (5) Red Jacket and Wilson, (6) Manchester and Chas. Downing, (7) May King, (8) Green Prolific and Kentucky; the remainder were practically failures.

Arranged according to their *productiveness*, averaging the past three years together, the list would stand (1) Crescent, (2) Windsor, (3) Manchester, (4) Mt. Vernon, (5) Glendale, (6) Red Jacket and Capt. Jack, (7) Wilson, (8) Chas. Downing and May King; others unworthy of mention.

According to the *season* of ripening, the list would read (1) Crescent, (2) May King, (3) Wilson, (4) Capt. Jack, (5) Red Jacket, Chas. Downing, (6) Manchester, Glendale, (7)

Windsor, (8) Mt. Vernon. The list here may be better divided by calling the first five groups early, the next medium, and the last two late.

The above data do not differ materially from notes on the same subject as observed in other places.

There is a very great difference, however, between the productiveness of the several varieties as grown here, and at Minneapolis, 300 miles northeast, or at Des Moines, the same distance southeast. From a plantation, such as we have at this station, were it located at either of the places mentioned, five thousand quarts of fruit would have been picked this season; the crop here gathered measured only 600 quarts. This, too, in spite of the fact that the plantation was in very good condition, contained an ample quantity of perfect sorts to insure fertilization, and the season, after the plants began to bloom, was as good as could be desired. It is safe to say that practically every flower that opened produced a fruit, thus proving that all were fertilized.

The reason for the small crop, as compared with the production in localities better adapted to the culture of the strawberry, can be found in the very dry autumn of last year. The strawberry, like the apple, cherry, plum and other fruits, begins to form blossom buds the season before the fruit is produced, and during the late summer and autumn the buds are being slowly perfected, so that by the time winter comes they are in quite an advanced stage of development. This is why the bloom appears so early in the spring; only a few warm days are required to complete the forming of the flowers, which was begun the previous summer. It will be readily understood, that the number of blossoms and to a great degree the extent of their development, must depend upon maintaining the plants in vigorous health throughout the late summer and autumn, and for this a sufficient amount of moisture is absolutely essential. Last year (1890) 2.07 inches of rain fell in August, .45 inches in September and .31 inches in October, or a total of 2.83 inches during the time when the fruit buds were forming. The precipitation at Minneapolis for the same period was: August, 2.16 inches; September, 3.78 inches; October, 3.63 inches, a total of 9.57 inches, or 6.74 inches more than at Brookings.

So far as the fruitfulness of any plant is concerned, we may regard the crop as representing the excess of elaborated plant food after the needs of growth are met. A plant can have sufficient food material at hand barely to live, or to maintain thrifty growth, or to keep in a healthy condition and produce a fine crop of fruit. Succulent fruits, such as the strawberry, demand more moisture in the soil for their perfect development than dry or hard fruits. There has been sufficient moisture during the three years of observation on the strawberry to keep the plants in growing condition, though no variety has grown so luxuriantly as in moister climates; bnt from the first, our plantation has not been fruitful. It will be observed there was a very light rainfall here during the late summer and fall, and a small strawberry crop resulted.

Continued dry weather is a complete check to successful strawberry culture. A short period of drouth can be met and the evil effects avoided by thorough cultivation or by heavy mulching. At the station both plans have been tested, the results being so nearly alike that no superiority was shown in the one method over the other. The important point to be emphasized, is the necessity of conserving the water supply in every possible way.

While field cultivation may not be profitable, there would seem to be no good reason why a small plat of strawberries, large enough to supply the family, should not be grown on every farm. The plat can be located near a well and the plants can be watered when necessary. If well cared for, a plat a rod square should furnish an abundance of fruit for a small family. The following paragraphs are reprinted from Bulletin, No. 23:

WHAT IS MEANT BY PERFECT AND IMPERFECT VARIETIES? —An examination of the open blossom of Wilson's Albany or Wilson's strawberry, will reveal four sets of parts in the flower. In the center is a number of small light green parts, forming a rounded mass. This is the portion that becomes the fruit. Surrounding this central part are a number of little yellow organs, each borne on a tiny stem. These are the anthers and they contain the fertilizing material of the flower. Just without the anthers are the five white petals, and behind and underneath these will be found the green scales that form the calyx.

Every variety of strawberry that has these four sets of parts is called a perfect variety and will produce fruit when planted alone.

But if we examine the Crescent strawberry we find that the second set named, the anthers, are not present or are abortive; that is, the Crescent flower does not contain any fertilizing material, and hence this variety is "imperfect" and will need to have a perfect kind planted with it in order to produce fruit. It is necessary to keep these facts in mind in planting a strawberry bed. I have always had good success by setting first a row of perfect-flowered sort, like Wilson, then two rows of an imperfect sort like Crescent, than a row of perfect-flowered sort, followed by two rows of imperfect, etc. As each flower produces a great deal more pollen than is necessary for its own fertilization, the imperfect sorts are provided with pollen by winds and insects which carry it from the perfect flowers. The imperfect varieties are much more prolific than the perfect sorts, and for this reason should make up the greater part of the plantation.

PLANTING AND CARE.—Strawberry plants should have the roots puddled as soon as received from the nursery. Fine dust should be sprinkled among the roots as soon as puddled, and if the ground is not ready for planting, the plants should be "heeled in" and the tops lightly covered with straw. If the weather is very dry when the plants are received, the bunches may be set close together in fine earth, and the plants shaded by boards which will allow a free passage of air between them and the leaves. They should be well watered, as often as necessary, and should not be planted out until new rootlets begin to appear. In this condition they are much more sure to grow.

The plants should be set from fifteen inches to two feet apart, alternating perfect and imperfect sorts as heretofore suggested. The stem of the strawberry plant is extremely short, which makes careful setting necessary. The holes should be large enough to permit the full spread of the roots, without turning the tips. The plants should be so set that the bud in the center is not covered, nor the roots exposed. Firm planting is necessary.

With careful cultivation matted rows will form the first year from plants set fifteen inches apart in the row. When the ground is frozen in the fall sufficiently to bear the weight of a wagon, the entire bed. rows and spaces, should be mulched with two or three inches of clean straw or swamp grass, and this should be left on in the spring until the leaves begin to grow through it. The mulch should then be raked off the plants into the spaces. By leaving the mulch on late in the spring growth is retarded and danger from late frosts is avoided.

It is of the greatest importance, in setting out a strawberry bed, to have the land moist at the time of planting. Last spring a large number of plants, including about sixty varieties, were lost owing to dry weather at the time of setting and thereafter. The plants were received the third week in April, and the ground was very dry at the time. They were "heeled in" and watered, and growth began. About two weeks after the plants were received, the indications pointed to a good rain, and the plants were set out in rich garden soil. Only a slight shower fell, however, and no more rain came for a month. During this time every effort was made to save the plants by copious watering and hoeing. But the bright sunshine and extreme drouth was too much for them and so few were saved, that the entire planting was practically a failure. It is almost impossible, without irrigation, to water newly set plants enough to save them, if the plantation be large.

VARIETIES.—When the strawberry bed was planted it was impossible to secure the same quantity of all the varieties used, and hence any record of pickings would be misleading. The estimate of fruitfulness, growth, quality, etc., is based upon observations continued through three seasons, unless otherwise noted.

PERFECT VARIETIES.—*May King.* This variety does not make a strong growth, and is not fruitful enough to be profitable. It makes but few new plants as compared with Crescent, and the foliage is not good enough for our hot sunshine.

Wilson. This sort is but little better than May King. The foliage is better aud it is a healthy plant, but it is one of the poorest croppers in the plantation.

Chas. Downing is not so healthy a plant as Wilson, but better than May King. The fruit is the sweetest of any sort we have, and larger than I have seen of this variety elsewhere, but there is too little of it to grow even for the home garden.

Red Jacket has produced some of the largest berries grown. It is more prolific than any of the perfect kinds named above, but does not compare with Crescent in this respect. The foliage is large, but rusts somewhat during the summer.

Capt. Jack has fine healthy foliage, and stands the drouth well; it is next to Red Jacket in productiveness. but the berries are smaller.

Cumberland. This variety has failed with us. It is a poor grower and yields the least fruit of any sort tested.

Sharples. A failure here.

Glendale is later than May King, Capt. Jack or Downing, and more productive than any perfect flowered variety except Mt. Vernon. The quality is inferior, but the fruit is large and the plant strong and healthy.

Mt. Vernon set a good crop of fruit last year, but the old plants were not so productive this season. The latest of the older varieties, and one of the best in plant and fruit.

Belmont, Prince, Jumbo, Indiana and *Sucker State* failed either in healthfulness of plant or in productiveness.

IMPERFECT VARIETIES.—*Crescent.* This variety is the most prolific and earliest of all the sorts tested. Other kinds have ripened a few fruits earlier, but the first picking has always been from the Crescents. The first fruits are of large size and the entire crop is satisfactory. While not comparing in quantity with the same variety grown in states further east, in quality and size, the Dakota grown fruit equals or surpasses the best I have seen anywhere. The plants are healthy and stand the hot summers of the past two years as well as any variety It can be recommended as the most satisfactory of the varieties tested at this station.

Manchester. This variety is a good cropper, but is not so vigorous a grower as Crescent. It produced very large berries

the present season. It ripens between Crescent and Windsor, and is an excellent sort for keeping up the supply.

Windsor Chief or *Windsor* is next to Crescent in productiveness; the first fruits are very large and the entire crop is of good size. The berries are a very dark red when fully ripe, and ripen slowly. The last picking was of this variety, July 20th, about a month after the first strawberries were ripe.

Green Prolific is not fruitful enough to be profitable here; its season is the same as Windsor, which can in all cases be substituted for it.

NEW VARIETIES.—The only new varieties that fruited in our grounds this season were Alpha, Pearl, Bomba, Jessie, Parker Earley, Woodruff and Mammoth. Of these but a few plants were grown, and a fair estimate of their value can hardly be made. Jessie proved disappointing, almost all the fruits being imperfect and knobbed. Alpha is as early as Crescent, more prolific than any of the older perfect sorts and should prove a valuable fertilizer for Crescent. The fruit is of medium or small size, but its earliness and the large quantity of pollen in the flowers should make it useful.

Parker Earle is the most promising of the new varieties fruited. It ranks next to Windsor in productiveness, the fruit is large, beautiful and good and it should be a good fertilizer for Manchester and Windsor. Bomba is early, the fruit of fine size, but it lacks flavor. Woodruff promises to be a prolific bearer. Pearl and Mammoth gave a few very large fruits. All these varieties are equal to or better than Manchester in growth.

SAND CHERRY.

The sand cherry (*Prunus pumila L.*) is a native of the Dakotas. It is found throughout the valleys of the James and Missouri rivers. It grows readily from the seed, and can be propagated from root cuttings. It is a rapid grower, and begins to fruit the third year from the seed. It is the most dwarf of all the cherries, growing in the form of a bush, like the currant; and seldom attaining a height of more than four feet. It branches freely and when in full flower, in the month of May, it is an ornamental object. The flowers are produced in clusters of two or three from every bud on the one year old branches. They appear with the leaves, the blossoms completely hiding the young leaves from sight. In size they are like the bloom of the wild plum, in all other respects resembling closely the flowers of the cultivated cherry. They differ from the other forms of wild cherry (*P. serotina* and *P. virginiana*) in the flower cluster, the latter having their flowers in drooping racemes.

Plants of sand cherry set three years ago, bore heavily last year and again this year. Careful testing of the fruit of different plants shows a great variety in the quality, and suggests possibilities of improvement in the species.

Fruit begins to ripen the first week in August. The cherries on most of the bushes were ripe by August 20th, and some few will last into September, showing a season of from four to six weeks in a seedling plantation.

Classifying roughly according to the fruit we find yellow and black fruited sorts. The yellow fruited sorts, as a class, are earlier than the blacks, and of rather better flavor. They are greenish yellow when fully ripe, and vary in size, the largest being about the size of a medium early Richmond cherry. In quality they differ greatly; on a few bushes the fruit is almost free from the crude "puckery" flavor common to all wild cher-

ries, but the majority are no better than choke cherries. The stone is as large or larger than in Early Richmond, and the pulp is very watery, having little substance. The skin is rather tough and varies greatly in thickness and stringency in different plants. Cherries selected for size and flavor were cooked, the fruit of several different plants being cooked separately, the pits being removed in all cases before cooking. The best gave an insipid sauce, having little of the character of the cultivated form of the cherry and yet good enough to be relished where no other fruit can be had. A jelly of inferior quality, of a light yellowish green color, was made from the juice pressed from the fruit before cooking. Jam made from the fruit was less palatable than the stewed cherries. As the fruit is very juicy the jam consisted almost entirely of the skins.

The dark colored sorts range from dark red to deep black, and in size, quality and season vary as much as do the light colored kinds. Seeds have been saved from the best of all the bushes, and their action under cultivation will be observed.

An effort was made last spring to fertilize a number of flowers of sand cherry with pollen of the Vladimer, a Russian form of Professor Budd's importation, but owing to cold, cloudy weather at the time the work was unsuccessful.

While of little value when the quality of the fruit is considered, it would seem that these dwarf cherries should give rise to a race especially adapted to the northwest. They have withstood all the dry weather of the past three years without injury, and they have been covered with bloom for two seasons, though unprotected during the winter. Their flower clusters and fruits show a close relationship to our cultivated forms, and hence crossing with the latter should be feasable. In this way varieties having qualities superior to the natives may be secured. The quality of the fruit is too poor to justify the extensive cultivation of the sand cherry, but even in its present form it deserves a place in every Dakota farmer's garden, just as the wild plum deserves a larger place in every Dakota orchard.

NOTES ON VARIETIES OF THE PLUM.

Several of the varieties of plum in the Experiment orchard have fruited this season, and observations were made with reference to the hardiness and healthfulness of the trees, the time of ripening and the quality of the fruit.

The plum orchard was planted in the spring of 1888, the trees being two and three years old at the time of planting. The orchard has been thoroughly cultivated during the earlier part of each season since it was planted, and during late summer and fall the natural grass growth has been permitted to stand. Last year two varieties of plums fruited. The present season the following kinds have borne fruit: Harrison's Peach, Forest Garden, Rare Ripe, De Soto, Van Buren, Wyant, Speer, Rockford, New American, Wolf and Crescent City. Several varieties, notably De Soto, Harrison's Peach, Speer, Rare Ripe, and New American, were heavily loaded considering the age of the trees.

On August 23rd and on September 3rd this vicinity was visited by frosts that completely destroyed corn standing on low ground, and while there was no apparent injury to the plums, the development of the fruit was doubtless retarded.

Beginning September 15th, a very heavy south wind, accompanied by heat reaching 96° F., blew almost without cessation until the 25th. As a result of this unusual weather the fruit of several varieties dropped before maturing, and hence no definite notes can be given on Speer, Crescent City and Van Buren, as the fruit of these sorts was all blown off before it ripened. The fact, however, that these varieties failed to ripen before Sept. 25th is sufficient in itself to condemn them for Dakota planting. Usually there is a killing frost before the 15th of September in central and northern South Dakota, and to be reliable in this state plums should ripen before that date. It will be with plums as with small fruits, early maturity

one of the important qualities. The present season has been later than last year. Harrison's Peach ripened the 6th of September last year, and the 13th this season. Earliness will have to be insisted upon in any variety of the plum that is to supply the demand in this state. None of the sorts fruited this year are early enough, though several of them matured.

Prof. T. A. Williams, while on a collecting expedition for the college, discovered several varieties of wild plums of superior excellence in the Bad Lands of South Dakota, all of which were fully ripe September 2nd. Two varieties—one a medium sized yellow plum and the other a mottled red—were gathered August 28, fully ripe. A large red free stone sort was picked September 1st, and of these three kinds seeds were saved and will be grown at the Station.

Mr. A. Norby, of Madison, Lake Co., brought some very fine specimens of a seedling plum which he had grown from pits secured in a native thicket in northern Iowa, to the Station the last week in August, and said they were the last of the crop to ripen. The plums were larger than the De Soto, yellow suffused with red, of fine quality for eating from the haud, but not so good when cooked. The variety, which has not yet been disseminated, is of value in this state because of its earliness, and it indicates the source whence must come the plum for Dakota. Until a better cooking plum of equal earliness is found, Mr. Norby's seedling, and others which combine the qualities of good size, earliness and fair quality, are worthy of general cultivation.

The following notes indicate the character of the several varieties that have fruited in our grounds this season.

Harrison's Peach. Tree a vigorous grower, hardy, and of good habit. Fruit larger than De Soto, yellow with solid red on sunny side and becoming almost an entirely red when fully ripe; round in cross section and one third longer than thick; almost a free stone; pit large and flattish; quality best for eating from hand, and very good for cooking. First ripe September 13th. The fruit held well until the severe wind of September 15th began to blow, but almost all fell within twenty-four hours after the storm began. This seems the most promising variety in the orchard. It bears while

quite young, the fruit in of fine size, high quality, and is beautiful enough to command the best price in the market.

Wolf. Ripe September 21st. Fruit as large as Harrison's Peach; color red over yellow; pit smaller than Harrisons, making more flesh in the fruit than that variety; fruit better than De Soto, but not equal to Harrison's; tree hardy, but not so good a grower as De Soto. It bore heavily last year, but not so well this season. The fruits were nearly all blown off by wind when the first were ripe; they cling to the tree better than Harrison's. In ordinary seasons too late.

Rare Ripe. Ripe September 11th; skin dark red, showing yellow below; cling stone; size a little smaller than De Soto; shorter diameter about two thirds of the longer; quality rather better than De Soto, but inferior to Harrison's Peach; it is not so good a bearer as Harrison, but withstands the wind better; no better in this particular than De Soto, and on the whole it cannot be considered an improvement on that sort. Tree hardy and a moderate grower.

New American. All fruit blown off by wind September 22nd, when about two thirds ripe; fruit larger than Rare Ripe and not ripe enough to judge flavor. Too late to be considered an acquisition.

Forest Garden. Ripe September 11th, and all specimens ripe sooner than any other variety; dark red with bloom, usually showing a little yellow; fruit small, with small very plump pit; very sweet and juicy, quality good for both cooking and eating; bloomed freely but set few fruits; the branches of the trees split badly by wind, and several trees entirely destroyed by wind; weakest in wood and least productive of any variety tested.

Wyant. Ripe September 20th; fruit of the largest size, oblate, somewhat pointed to one side the apex; color very dark red, with little yellow on one side and covered with fine bloom; almost free stone; pit large and flattish; flesh somewhat stringy when ripe; quality not better than De Soto. Handsomest plum that has fruited this season; tree low and spreading, hardy and a vigorous grower.

APPLES AND CRABS.

Seventy-five varieties of apples and crabs were set in orchard in the spring of 1887. These consisted largely of Russian varieties, and the standard and newer sorts of crabs, together with a number of trees of Dutchess, Wealthy and Whitney's No. 20. During the past season three varieties of the of the crab have fruited. Looker's Winter and Gideon's No. 25 each bore a few fruits, and Dartt's Greenwood fruited heavily. Looker's Winter is a medium sized crab, probably winter in season; the specimens were blown off by the heavy winds of September before they were mature. Gideon's No. 25 is a little larger than Whitney's No. 20, a crab of superior quality; season late September; color light red with bloom; tree a good grower, and thus far hardy and free from blight. Greenwood produced a good crop of medium sized crabs, yellow with blush on sunny side; quality good; acid; a fine cooker; season middle of September; tree an upright grower, with light greenish bark; hardy and seemingly well adapted to the soil and climate.

No blight has appeared in the experiment orchard the past season. The trees came through the winter in unusually good condition and have made a fine growth.

As apple trees give but little indication of their real character previous to bearing a few crops of fruit, no notes are here given of the hardiness, growth, etc., of the several varieties. It is well known that many fruit trees will stand the winters without injury, and the summers without showing blight until they reach fruiting age. A few heavy crops seem to weaken the vitality of the trees, or subject them more readily to injury from blight or excessive cold, or drouth, or other conditions through which they have thus far come. Hence favorable indications in youth are not a safe basis, for judging of a variety and judgment should be deferred until the trees reach bearing size.

De Soto. Ripe September 20th; size a little more than an inch in diameter, from stem to apex, and an inch in cross-diameter; yellow, almost covered with red, which is densest on one side; quality good, both for cooking and eating; our trees bore very heavily, several trees four years old having branches hidden by the fruit; tree hardy and a fair grower; the standard variety in this state. The only objection that can be made to De Soto is that it is too late in season. There are occasional years when the fruit is injured by frost.

Rockford. But few fruits of this variety set, and none reached full maturity, so that nothing definite can be said of it. From the condition of the last specimens to fall its season is about September 15th.

Twice during the past season the orchard was pruned by pinching back the new growth on the north side of the trees. The tendency of trees to grow most on the north side is much more marked in Dakota than in regions more favorable to orcharding. If not checked the trees become very one sided, and in time the south side will become less strong and healthy. The best method of overcoming this difficulty is to pinch back the tips of the branches on the north side, thus permitting the branches on the south side to catch up with, or even surpass the north side. It is important to keep the south side of the tree heavier, as it thus shades the trunk and the larger branches, thereby preventing sun scald. Another advantage of pinching as a pruning method, is that branches can be removed when they first make their appearance in a place where they are not wanted. The ordinary practice in pruning is to leave the tree without care until it attains fruiting age, and then "thin it out" by sawing off good sized branches, making wounds that are not easily healed, which afford favorable means for rot or decay to enter the tree. If only such branches as are desired are permitted to grow, all others being rubbed or pinched off as soon as they appear, the tree is not forced to expend its energy in healing large wounds, and consequently has a better chance to mature its wood and to reach a good old age. These are matters of minor importance in regions favorable to fruit culture, but it should be constantly borne in mind that in the greater part of South Dakota it is necessary to give the tree every possible assistance in order to make it succeed.

Since the experimental orchard was planted, three different methods of summer treatment have been pursued, and so far as has been observed, no appreciable difference has resulted in the growth of the trees, or in their condition the spring following.

The first year clean cultivation was practiced. During the early part of the season the weeds were kept out with an Acme pulverizer; after the middle of July the orchard was kept clean by hoeing. When winter came a small mound of earth, about a foot high, was made around the base of each tree. This treatment was expensive, but it kept the orchard in fine condition and contrary to the prophecy of many visitors the trees came

out in the spring with but very little injury. The second season the Acme pulverizer was kept going until midsummer, and the weeds were hoed thereafter, but the orchard was not kept so clean as before; no perceptible difference, either in growth or the amount of winter killing, resulted. The third season a row of corn was drilled midway between the tree rows, from north-east to south-west, the object being to have the corn stalks catch the winter snow and thus afford protection for the trees. The presence of the corn made the use of the pulverizer impossible, and cultivation was given with a wheeled cultivator until mid-summer after which the orchard was hoed twice—not enough to keep it clean. The winter following was very mild with little snow. The trees came out in the spring with little if any injury. Growth from terminal buds was noticed in more trees than in either of the preceeding seasons, but there has been no serious injury from winter killing since the orchard was planted During the past season the orchard was plowed early in the spring, the furrows nearest the trees being very shallow, and those midway between the rows being deep; after the plowing and until the middle of July the ground was kept perfectly clean and well stirred with the pulverizer and hoe, and since then nothing has been done with it, the natural weed and grass growth being undisturbed. As in previous years the growth has been healthy and strong and the wood gives every appearance of being well matured for winter.

A second experimental orchard was planted last spring, and in this, after clean culture had been kept up till the middle of July, a thin sowing of buckwheat was made. During August and September the orchard was undoubtedly benefitted by the presence of the buckwheat, which measurably protected the soil from the intense heat of the strong south wind.