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AGRICULTURAL AND MECHANICAL COLLEGE,
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STRAWBERRIES.

F. S. EARLE.

BIRMINGHAM
ROBERTS & SON.
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Strawberries.

BY F. S. EARLE.

No fruit is of easier culture and none succeeds under more widely varying conditions of soil and climate than the strawberry. Ripening as it does with the first warm days of spring, its acid juice is particularly refreshing and seems to have been fitted by nature to the needs of the system at this season. There can be no doubt that the free use of strawberries adds not only a pleasant and agreeable, but a very healthful feature to the spring bill of fare. This fact is appreciated by the people of the northern cities as is shown by the immense and annually increasing quantities of this fruit that find sale in these markets. Growing the berries to supply this enormous northern demand, now furnishes one of the principal and most remunerative industries for a large number of southern communities; and it is recognized as one of the most important of horticultural money crops. As has been previously pointed out, (see Bull. 79:85) the people of this state have so far paid but little attention to commercial horticulture, although we possess a climate and soils as well adapted to the growing of fruits and vegetables as any of our neighbors. There are but few points in Alabama where strawberries are grown in sufficient quantity for shipment. Cullman, in Cullman county, on the Louisville and Nashville Railroad, is the largest shipping point.

In the opinion of the writer the strawberry acreage of the state could be largely increased with profit, and with less chance of loss than with most other horticultural crops. This is a point however that must be left to the individual judgment of planters. I wish however to again call attention to the necessity of carefully studying the requirements of the

business, and of its adaptability to local conditions; and especially to the necessity of providing refrigerator transportation facilities before embarking heavily in the business. This, of course, where shipment to the great northern markets is the object. This necessary requirement of the best possible transportation facilities will confine the large planting of berries to a few shipping centers. For this reason, persons coming to the state for the purpose of growing berries are earnestly advised to locate at some point where the business is already established.

There is, however, a considerable home market that is now very inadequately supplied, and that might well repay the attention of a great number of scattered growers. Every family in Alabama ought to have this healthful and delicious fruit on the table every day for six or eight weeks; but not one in ten—no, not one in fifty—is thus liberally supplied. There are few families in the state outside of some of the larger cities who could not command the small amount of land and labor to raise an abundant home supply, and thus enjoy the luxury of having them fully ripened and freshly gathered as needed. Many people will, however, buy berries if offered in attractive shape and at a reasonable price, who would not take the small amount of trouble necessary to grow them. There is not a town of any size in the state where one or more farmers could not make a substantial addition to their income by planting an acre or so of strawberries and marketing them regularly. At first the demand might be small but it would grow rapidly if stimulated by a constant supply, for people soon learn to eat much more fruit if it is constantly at hand in tempting condition. If even a small per cent. of the people of the state can be induced to plant more berries for home consumption, this Bulletin will have accomplished its purpose. The larger commercial growers are mostly in possession of the information it contains.

SOILS AND FERTILIZERS.

Any fairly good, well drained soil will answer for growing strawberries for home use or for local markets. A soil

that holds moisture well is preferable to one that is too dry, but on the other hand, hill land is preferable to bottom land on account of its greater freedom from spring frosts. For growing berries for distant shipping a strong, rather stiff clay soil is greatly to be preferred to one that is sandy, because berries grown on such clay soils are firmer and carry to market in much better condition. This is a point of great practical importance to the distant shipper.

Land that is full of foul weed seed or that is set to Bermuda, coco or Johnson grass should not be selected for strawberries on account of the greatly increased labor and expense of cultivation. All but very rich land should be liberally fertilized to secure the best results, though some fruit may be expected without fertilizers even on quite thin soil. Stable manure is not advised under most circumstances on account of the danger of introducing grass and weed seeds. The proper mechanical condition and ability to resist drouth can best be secured by plowing under a crop of cow-peas well in advance of planting. This green manuring should be supplemented by applications of acid phosphate and potash under the row. Too large a proportion of nitrogen is not desirable, since it sometimes causes a rank growth of vines at the expense of fruit, and renders the plant more liable to suffer from rust. A light top dressing of nitrate of soda applied in the spring just before blooming is often useful in increasing the size of the fruit.

PREPARATION OF SOIL AND PLANTING.

The land for strawberries should be deeply plowed, and the plow should be quickly followed by the harrow, not once, but three or four times in a place so as to pulverize all lumps before they harden into clods, and to cover the entire surface with a coating of fine mellow soil to prevent undue evaporation. This quick harrowing of the soil immediately after breaking is of the utmost importance for all crops, especially on stiff lands, and it is a point that many farmers overlook. In only too many cases the rough furrows are allowed to lie and bake into clods that it may require weeks of labor to pul-

verize, while the moisture that should be sealed up and preserved in the ground by the harrow for the use of the coming crop is allowed to evaporate and waste.

About ten days before planting lay off the ground with a shovel plow, running the rows three to three and a half feet apart. Scatter the fertilizer in the furrow, mix by running once or twice with a scooter, and then bed as if for cotton. Just before planting drag the beds down with the back of the harrow, or with a heavy plank drag so that the top of the bed will not be more than two or three inches higher than the water furrow. This will drag all trash or clods to the middles, and will leave a bed of moist, mellow, but slightly compacted soil to receive the plants.

When the plants are taken up, the old leaves and runners should be pulled off and the plants should be bunched with the roots all lying one way. It is not necessary to tie the bundles except where they are to be sold by count. Pack them closely side by side, if in a box with the roots down, or if in a barrel with the roots to the center. Always keep plants covered with dampened sacks to prevent drying. When ready to begin planting, put an inch or two of water in an ordinary wooden bucket and pack in a layer of plants with their roots in the water, this keeps them fresh and also causes the soil to adhere more closely to the roots when planted. The planting crew consists of a man with a bright, sharp spade, and a small boy with the bucket of plants. The man sets the spade in front of him, with the corner of the blade at the spot where the plant is to stand, throws his weight on it, driving the sharp blade full length in the mellow soil, and then pushes it from him so as to open a wedge shaped hole behind the spade. The boy has a plant ready, holding it by the top, and with a slight swinging motion, brings the plant to its place in the corner of the hole, with its roots extending full length, and the crown held just at the surface of the ground. The man withdraws the spade, setting it forward ready for the next plant, and as the dirt falls back about the plant he puts his foot on it, pressing it closely about the roots. With a little practice, plants can be set in

this way very rapidly and satisfactorily. There are just two points to keep in mind. First, the plant must be left at the right depth—not so deep as to cover the bud, nor so shallow as to expose the roots—and, second, the dirt must be packed closely about the roots. This last can be easily tested by taking hold of the plant by one leaf and trying to pull it up; if properly set, the leaf will break without loosening the roots. Directions are often seen in print for “spreading the roots out like a fan,” or for making a hole with “a mound in the middle, round which the roots can be placed in a natural position;” but time spent in such pastimes is simply wasted. New roots as they grow will quickly spread out in all directions. The office of the bundle of old roots is simply to hold the plant firmly in place and to supply it with moisture till the new roots are formed.

This same method of planting with a spade can be used equally well for cabbage, tobacco, sweet potato slips, or any other small plants, and it will be found more rapid and satisfactory than the more laborious method of planting with a dibber or a trowel.

The subsequent cultivation of the plants will be facilitated by having them in perfectly straight rows. This can be done by stretching a line against which to set the spade in planting; or a mark can be made by dragging a chain or rolling a light wheelbarrow along the row. A serviceable wheel marker can be made from an old buggy wheel by attaching handles wheelbarrow fashion and nailing short bits of lath to the rim at the right distance apart for the plants with the ends slightly projecting so as to leave a slight indentation in the soil. This will not only secure accurate alignment but accurate spacing as well. Plants should be set from twelve to thirty inches apart in the row, according as the variety is a good runner or not, and according to the richness of the soil and the season of planting.

At the north strawberries are usually planted in the spring, while in Florida the usual practice is to plant in late summer or fall. In this state we do not need to be confined strictly to either practice, but can plant with some prospect of

success at any time from August to March when the soil is in a suitable condition of moisture. The greatest drawback to fall planting is the drouth that so often prevails at that season. It is always more difficult to get plants to live then than in the winter or spring. In Southern Alabama strawberries planted in the late fall or early winter will, on rich soil, make sufficient growth during the mild winter to produce a fair crop in the spring, though not nearly so large a one as if planted in August or September. In Middle and North Alabama the plants will grow very little during winter, and planting should be made as early as August to secure a crop the following spring. It is always difficult to secure a supply of strong, well rooted plants as early as August, and unless the weather is unusually favorable it is difficult to get plants to live at this season when taken up and handled in the usual way. This difficulty can be avoided by striking the runners in small pots plunged in the soil along the row. Such potted plants with the ball of earth adhering to the roots can be safely planted at any time when the soil is in proper tilth. This method is often employed by market gardeners where land is scarce and valuable, for it enables them to take some early crop from the land before planting the strawberries. The greatest objection to adopting this method on a large scale is the expense of the pots. The labor of growing a field in this way would be less than that of planting in the spring and cultivating throughout our long summers. True the pots can be used over again year after year, but the initial expense would be heavy when many acres are grown. A modification of this system that does away with the expense of the pots consists in allowing the runners to strike in the open ground and then taking them up with a ball of earth by means of some of the various transplanters now on the market. This system has not been much practiced in this state, but it seems well adapted to the conditions in South Alabama, where the labor and difficulty of properly cultivating spring-set plants through the period of midsummer rains is very great, and where the fall drouths often prevent planting in the ordinary way until too late for the best results. In Middle and North

Alabama the average planter will usually get the best results by planting in February or early March. Plants set at this time will attempt to bear a few berries, but there will not be enough to be of value, and it is better for the vigor of the plants to cut off the flower stems and thus prevent fruiting entirely for the first season. The ripening of even a few fruits is a heavy tax on the vitality of a newly set plant that is not yet well rooted.

CULTIVATION AND MULCHING.

The cultivation required for strawberries is very simple and may be made much like cotton, except that more hand work will be required after the runners begin to grow and take root. The main requirements are, first, that it be shallow so as not to disturb the short fibrous roots; and, second, that it be frequent enough to keep down all weeds and grass, and to prevent undue evaporation by a mulch of loose surface soil. Some five-toothed cultivator like the Planet Jr. is usually used for working between the rows, though good work can be done with the ordinary cotton sweep by setting the wings flat to throw as little dirt as possible. The big eye hoe used for chopping cotton is not adapted to hoeing strawberries. A light garden hoe should be provided and it should be used with a shuffling motion, cutting out any small grass and weeds with the forward stroke, and leveling and fining the earth with the back stroke. In working around the plant the hoe should always be tilted a little so that the corner next the plant does not penetrate more than a fourth of an inch. Deep hoeing that disturbs the roots in hot dry weather is almost surely fatal. Such careless, improper work kills more plants than any other one cause. For the same reason big weeds should not be pulled up from among the plants in a dry time. Either wait for a rain or cut them out with a knife or chisel.

Some growers follow the plan of stopping regular cultivation about mid-summer and allowing the crab grass to grow up between the plants, only going over occasionally to chop out any big weeds that appear. If the grass does not come

up too thick it does not seem to seriously check the growth of the plants, and as it dies down in the fall it leaves a slight protecting mulch that prevents the baking of the soil and helps to keep the berries clean in the spring. This is, of course, a cheap method and it seems to succeed fairly well on some soils. It is doubtful, however, if it ever gives the largest crops, and there is always danger that the grass will grow thick and heavy enough to entirely smother the plants. Clean culture throughout the season is in most cases much more desirable.

At the north, berries are usually mulched heavily with wheat straw or some similar material when freezing weather sets in, to protect the plants from injury from severe cold, or from the bad effects of frequent freezing and thawing. This mulch is left between the rows in the spring to help hold moisture and to keep the fruit clean. No winter or spring cultivation is given. Here no such mulch is necessary to protect the plants during the winter, and two or three hoeings are necessary to keep down the numerous winter growing weeds that would otherwise choke the plants before the end of the fruiting season. The last hoeing should be given just as the plants begin to bloom, and a light mulch should now be scattered about the plants to prevent the fruit from being spattered by dirt when it rains. Pine straw is often used for this purpose, where it is available, and it answers fairly well, though it is open to the objection of harboring crickets and other fruit eating insects. Probably cotton seed or cotton seed hulls furnishes the best mulch to use in this state. Only a comparatively small quantity is required to cover the exposed ground immediately about the plants.

If the field is to be kept over for another crop, advantage should be taken of the first rain after the picking season is over, to bar off the rows, leaving them ten or twelve inches wide and throwing the dirt to the middles. An abundant application of fertilizer should be made in the furrows and the dirt be worked back with the cultivator before the row has time to get dried through. Subsequent cultivation is much as with new set plants. The number of crops that it will pay

to take from a field will depend on various circumstances. Sometimes plantings will continue to yield well for three or four years. Usually it will be found best to plow them up after the second crop. At the south where fall planting is successful, the tendency will be to take only one crop, thus occupying the land only half the year, except so far as necessary to grow plants for the fall setting.

The advisability of keeping strawberries strictly in hills, or of allowing them to make runners and form matted rows is a question that has been widely discussed, and on which opinions and practice still differ. The bulk of the testimony seems to favor a narrow matted row, with the plants set somewhat thinly, to either a wide row or hill culture. It is safe to say that nine-tenths of the berries marketed in this country, are grown in matted rows, and this method is recommended for all spring set plants. When planted in the fall, most kinds make very few runners till after the fruiting season, so that fall planting, practically means hill culture, so far at least as the first crop is concerned. For this reason, plants should be set closer in fall than in spring planting.

INSECTS AND DISEASES.

Strawberries are the favorite food plant of a long list of noxious insects. Some attack the leaves, others the roots, some bore into the crowns, while still others eat holes in the fruit or injure it by sucking the juice, thus causing it to "button" or dry down into hard unsightly knots. When berries are grown continuously in large quantity in any neighborhood, many of these pests are sure to become troublesome. So far, there has been very little complaint of damage in this state, and no detailed account of strawberry insects will be attempted here. The best preventive measure is a quick rotation of crops. The plan of plowing up fields when the crop is gathered, and replanting in the fall, where this can be successfully done, will prove very effective in controlling many of these pests. For a full account of strawberry insects, the reader is referred to Bull. 42, of the Florida station. The

only fungus disease that need be mentioned here, is the so-called rust or leaf spot. This causes white, red-bordered spots on the leaves; if sufficiently abundant, it finally kills the foliage, but its greatest damage is done by attacking the fruit stems and calyx, causing them to become brown and brittle. Such fruit is always inferior in flavor and appearance. Serious damage is often done in this way, when the foliage is but little injured. This disease occurs in all parts of the country. Some varieties are much more injured by it than others, and probably our best means of combating it is by selecting resistant varieties. It was at one time held that dusting the fields with air slacked lime in the spring, helped to hold the disease in check. It will often be noticed that mulched plants are less injured than those that are unmulched. At the north many growers practice setting fire to the mulching after the crop is picked, thus burning off the leaves entirely. This plan is very effective in destroying leaf diseases and insects. It should, however, be tried with great caution, if at all, on our light soils, and only when the ground is thoroughly moistened by recent rains. The remedy now universally recommended for rust is to spray with Bordeaux mixture (6 lbs. copper sulphate, and 6 lbs. quick lime, to 50 gallons of water.) There can be no question that this is often useful, though spraying strawberries at this station, has so far yielded only negative results. More experimentation is needed to determine when and how often to spray under our conditions.

MARKETING.

Little need be said here under this heading further than to call attention to the general remarks on this subject in Bull. 79, pp. 103-110. No fruit requires greater care in handling than the strawberry. It is necessary to pick the fields all over carefully every day, or every other day at farthest, in order to prevent getting over-ripe fruit in the boxes. For the same reason the pickers must be carefully watched to see that no ripe berries are left on the vines and that no over-ripe ones go in the boxes. When many hands are used an overseer

should be placed in charge of each gang of thirty or forty hands, whose duty it should be to pass back and forth among them constantly, inspecting the work, examining the fruit in the boxes, assigning rows, and keeping order. The berries for distant shipment should be picked as soon as they are colored all over but before they begin to soften. Some varieties will color up nicely in transit if picked a little green. This is a very desirable point in a market berry, for it is often difficult to prevent pickers from taking the fruit as soon as it is colored on the upper side. Kinds that do not color after picking will go into market showing so many green sides as to seriously affect prices. In picking the berry should be seized by the stem, pinching it off about half an inch below the fruit, which is then laid in the box with as little handling as possible. This is a point of vital importance. Berries that are seized in the fingers and pulled off are ruined for distant shipment, and are made so soft and mussy as to become quickly unfit even for home use or the nearest market. The only berries exposed for sale on the streets of Auburn this season were so damaged by this careless "pulling" that they were unfit for use before noon, though brought from a neighboring town only six or seven miles away.

Berry pickers are usually paid by the quart, the price ranging from one to two cents in different localities. Accounts are often kept by means of printed pasteboard checks ranging in value from one to fifty quarts, that are handed to the picker as the berries are brought into the packing shed. These tickets are cashed at the end of the week or of the season.

Packing strawberries neatly and rapidly requires skill and nimble fingers. All imperfect berries that are in sight are removed, and, if many are found, the box is emptied so that those in the bottom may be picked out also. The berries on the top of the box are then arranged closely side and side so that the box will be evenly and closely filled. If this is not carefully done the fruit will be either too high so as to be crushed by the cover, or not full enough so that the berries will shake about and the box will not seem over half full when

it reaches the market. This packing does not imply "facing" where all the big berries are put on top, a practice that it is needless to condemn; but if honestly and skillfully done it adds materially to the market value of the fruit.

Strawberries are now universally shipped in cheap quart boxes or baskets that are given away with the fruit. The old system of return packages has been abandoned in nearly all markets. Numerous styles of packages are on the market. The one should be selected that is the most popular in the cities it is proposed to supply.

Strawberries that are properly handled can be usually shipped safely for twenty-four hours by express. That is, berries picked today can be shipped to markets where they can be sold tomorrow. If the weather is cool and dry they may be saleable on the second day, but there is always considerable risk in shipping for forty-eight hours by express. In properly managed refrigerator cars good berries will carry safely for four or five days. Planting strawberries for distant shipment is recommended only at points where such refrigerator service can be secured.

VARIETIES.

The proper selection of varieties for a given locality is an important question with any fruit. It is especially important with strawberries since many kinds are quite local in range, doing well in one locality and perhaps failing utterly only a few miles away on a different soil or under different cultural conditions. The following thirty-five kinds were planted on the Station grounds during the fall of 1896. They have, therefore, been under observation during two fruiting seasons. They were planted on a dry sandy ridge. Very little fertilizer has been used and the cultivation and treatment has purposely been made poorer than would be given by the average market grower. The object has been to give the different kinds as severe a test as possible, believing that any kinds giving satisfactory results under such conditions can safely be recommended for general planting. It is thought that the kinds here recommended can be safely planted in all parts of

the state. It is not intended to imply that other kinds may not do equally well or better under some of the varied conditions included in our territory. On stronger soils and under better cultural conditions many of the northern favorites would doubtless make a more satisfactory showing. No attempt has been made to measure the exact yield from each plot as it is not believed that estimates from such limited data are reliable. The following notes are not intended as descriptions of the varieties, but merely to indicate their behavior here. Those characterized as worthless are for the most part those that lack vigor under our rather trying conditions. It is not implied that they are not valuable kinds in regions to which they are adapted.

Planters should remember that some kinds are pistillate and will not bear unless planted near some perfect flowered varieties. The nursery catalogues always state whether flowers are perfect or not.

ANNIE LAURIE—Worthless.

BELMONT—Worthless.

BOUNCER—This is evidently a large fruitful berry where it is at home, probably worthless here.

BRANDYWINE—As a rule the very large berries lack vigor here. This one seems to be an exception, and it is strongly recommended as the best of the large late kinds.

BRUNETTE—Probably worthless.

BUBACH—This universal favorite has done poorly under the trying conditions of the test. Under better culture in a private garden it has done better and yielded some fine fruit, but it is much less vigorous than Brandywine and cannot be recommended for general cultivation in middle and south Alabama. It will probably do well in the northern portion.

CLYDE—Lacks vigor, worthless.

CRESCENT—This old standby is comparatively worthless here.

ELEANOR—Of considerable promise, and with better care would be valuable; worthy of farther trial.

ENHANCE—Like the last this is worthy of farther trial. It is very productive, but may prove lacking in vigor.

ENORMOUS—Large and fruitful, but foliage too weak, worthless.

GANDY—Not suited here; worthless.

GARDNER—This plant is more vigorous and seems better adapted to our conditions than any we have tested. It runs very freely, and the foliage is very resistant to rust. It is fairly productive, begins ripening early and continues in bearing a long time. Unfortunately the fruit seems a little soft to stand distant shipment, and the color is too light to suit all markets. It is heartily recommended for local use, but its shipping qualities should be carefully tested before planting it largely for market.

GIANT—Perfectly worthless here.

GLENN MARY—Unfortunately we failed to get a good stand of this valuable new berry. The few plants that lived have proved vigorous and very fruitful. The fruit is of the largest size, firm and of fine color. It is worthy of extended trial.

GREENVILLE—Worthless here.

HAVALAND—Vigorous and productive, but the fruit ripens so unevenly as to be practically worthless.

HOFFMAN—This favorite southern market berry has been very disappointing, and has scored a failure under conditions where it was expected to be a leader. It is considered a standard market variety for light soils.

JESSIE—Vigorous and fairly productive, but never seems fully satisfactory. It has some good points as a family berry but is not suited for market.

LADY THOMPSON—Undoubtedly the best one kind for general planting here. It is vigorous, early and productive. The fruit, while not the largest, is all good sized and of regular, handsome shape. It is remarkably uniform and free from small and imperfect berries, and holds its size to the end of the season.

MARSHALL—A promising variety, worthy of farther trial.

MARY—Complete failure, worthless.

MEEKS—Next to Gardner, the most vigorous plant on our grounds. The fruit is a dark rich red and the best in flavor of the entire lot. It begins ripening very early and continues throwing up fruit stems as late as the latest. The first berries are large but the later ones run small for market. It would doubtless ship well, but unfortunately the total yield seems too small, and shy bearing must be set down as its greatest fault.

MICHEL—This well known early berry does well here and is recommended with Lady Thompson for general planting. Some of the Northern Experiment Stations report this as a shy bearer, but here it is the most productive kind we have, though it needs rather better conditions than the severe ones of this test. It is our earliest berry, beginning slightly in advance of Lady Thompson and continuing considerably longer in bearing. While this is a good point for home use, a long bearing season is a doubtful advantage in a market berry for the South. Some complaint has reached the Station from different parts of the state that this berry rusts badly. Here we have had no trouble with it, but the foliage is certainly more delicate than that of some of the other kinds.

PARKER EARLE—This variety is always a failure on poor thin soils, worthless here.

RIO—Seems to be worthless.

SHARPLESS—This old favorite is worthless here.

SPLENDID—Worthless.

SUNNYSIDE—Worthless.

SUNRISE—Also worthless.

TUBBS—Seems fairly promising and worthy of farther trial.

WARFIELD—This standard market berry is out of its element and worthless.

WILLIAM BELT—This has merit, deserves farther trial.

WILSON—This old standby, the first variety to make commercial strawberry growing possible, has held its own wonderfully under the trying conditions of this test. Judged

by this trial alone, it could not be graded lower than third or fourth on the list as a general purpose berry.

WOLVERTON—Worthless.

The opinions formed of these different kinds may be summarized as follows:—

Earliest berry—Michel.

Best early kinds for general planting—Lady Thompson, Michel.

Best large late kinds—Brandywine, Glenn Mary.

Most vigorous vine and hardiest foliage—Gardner, Meeks.

Promising, worthy of farther trial—Eleanor, Enhance, Marshall, Tubbs, William Belt.

Of doubtful value—Bouncer, Bubach, Hoffman, Jessie, Wilson.

Worthless here—Annie Laurie, Belmont, Brunette, Clyde, Crescent, Enormous, Gandy, Giant, Greenville, Havaland, Mary, Parker Earle, Rio, Sharpless, Sunnyside, Sunrise, Warfield, Wolverton.