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# KENTUCKY FRUIT NOTES

W. D. Armstrong, Horticulturist, Editor

## ORCHARD SOIL MANAGE- MENT

A. J. OLNEY

Soil is of course one of the chief factors in fruit production. It must provide not only the water and soil nutrients needed by plants, but also the soil environment in which roots can thrive. Soils containing the same mineral elements may differ widely in fertility. This is due to variations in size of soil particles; in proportion of sand, clay and the more or less inert minerals; in absorption of rain; retention of capillary water; drainage of free water; and penetration of air. Thus, soils may vary considerably from farm to farm and even from field to field on the same farm. The best index of soil fertility is the growth of plants.

Most soils in Kentucky contain an abundance of the elements essential for fruit production, except nitrogen and, in some areas, boron. Nitrogen in the soil comes chiefly from the decomposition of organic matter and the work of micro-organisms on the roots of legumes. Even on Kentucky soils that are low in phosphorus for satisfactory growth of some crops, there is usually enough soluble phosphorus for satisfactory fruit production. Likewise with potash, though the major part is insoluble, the soluble portion usually is enough for fruit production.

Calcium is low in some soils, but fruit trees do best on slightly acid soils and caution should be taken not to over-lime. Sometimes, liming is necessary to obtain satisfactory cover-crop growth.

The only minor element so far found to be deficient for fruit production in some areas of Kentucky is boron. A deficiency is indicated when corky spots are found in the flesh of the apple. This deficiency

seems to be corrected by the use of 1 pound of borax, broadcast uniformly around a mature apple tree. The use of boron is not recommended generally because it is toxic if too much is used or if it is not carefully applied.

## NITROGEN FERTILIZERS FOR ORCHARDS

The only fertilizer element besides boron that has been found to produce a direct effect on either trees or fruit in Kentucky is nitrogen. The nitrogen fertilizers include sodium nitrate, ammonium sulfate, ammonium nitrate, and calcium cyanamide. All of these are good, but calcium cyanamide should not be used on sandy soils while the trees are in leaf. The percent of nitrogen should be noted. Sodium nitrate carries about 16 percent nitrogen; ammonium sulfate 20 percent; ammonium nitrate 33 percent; and calcium cyanamide 20 percent.

Long-continued use of nitrate of soda and calcium cyanamide tends to make the soil alkaline, while ammonium sulfate increases acidity. For this reason it is desirable to alternate these fertilizers after a few years' use.

Most orchards need nitrogen fertilizers every year. The rate varies from 2 to 10 pounds or even more per tree on mature trees, depending on the amount of growth. Trees that make a good medium growth tend to be more productive than those with either excessive growth or poor or spindling growth.

At one year of age, trees may receive about ¼ pound of sodium nitrate or its equivalent. The application per tree may be increased each year by about ¼ pound until bearing age.

There is considerable latitude in the time to use these fertilizers. Split applications (that is, part used

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during late fall to early spring, and part in June, depending on the size of the crop) is a good practice.

To promote tree growth and aid in set of fruit, nitrogen should be applied before April 1. The June application is used to promote the development of the fruit. The amounts to use at either time depends on tree growth and the size of the crop, respectively. Many peach growers consider a nitrogen application immediately after harvest of great value in feeding the trees and strengthening the fruit buds for the following spring.

### CULTURE

Cultural management of soils may be varied somewhat as to the use of cultivation and cover crops. The young orchard will need good cultivation during the first three years to encourage growth of the trees. Usually a cultivated crop can be grown between the trees to advantage during this period. After this time, clean cultivation should be reduced or given over entirely to cover crops. The practice to be followed should encourage the maintenance of organic matter in the soil and prevent erosion.

Cultivation during early April is not recommended because it may interfere with the fruit set. May and June is the time cultivation seems to be most beneficial, and a cover crop should be sown in late June or early July to protect the soil during hot weather. Soybeans or small grain may be used for cover crops at this time. The summer cover should be turned under about September 1, and a winter cover of winter barley, rye, or a mixture of rye and vetch should be sown. The success of a system of cultivation and cover crops depends on a satisfactory growth of the cover crops, and failure in this regard is too frequent in Kentucky to make such a system an ideal practice.

In apple orchards lespedeza and a mixture of grasses usually provides a good permanent cover. This system requires less labor than cultivation and cover, but somewhat heavier use of nitrogen fertilizers may be needed. Sometimes bluegrass sods become too heavy for good tree growth and the land should be broken and reseeded.

In peach orchards, Korean lespedeza has proven to be a good semi-

permanent cover crop. The lespedeza is not ideal because it dies in the fall, but it reseeds abundantly and the residue left during the winter gives some protection from erosion. The use of lespedeza over a period of years has been generally satisfactory from the standpoint of fruit production and the maintenance of soil fertility.

All sod systems of orchard management are subject to mouse trouble, and they provide a harbor to some injurious insects.

### REDUCE CARRY-OVER OF CODLING MOTH

A. J. OLNEY

Recent observations in Kentucky and neighboring states lead to the conclusion that the success of codling moth control in some seasons depends to a considerable degree on the number of codling moth carried over winter in the orchard. About two years ago the Department of Horticulture of the University of Illinois developed a method of spraying off the loose, flaky bark of apple trees which provides the principal hiding place in the orchard for codling moth worms during the winter. Here are a few brief excerpts from a discussion by Dwight Powell, University of Illinois, on this practice.

"Probably the one practice in apple orchard sanitation which helps most in codling moth control is removing rough bark by sprays. . . . Removing bark by spraying utilizes the conventional, single-nozzle gun equipped with an 8/64 inch disc which discharges the water in a narrow stream at 500 pounds pressure. The operator wears a rubber suit, boots, gloves and hat. Holding the gun two to four feet from the tree trunk, he can, in four or five minutes, thoroughly clean the rough bark from the lower limbs, crotches, trunk and crown of a 25 to 35 year old tree. It is important to keep the stream moving back and forth so as to clean off the bark thoroughly without injuring or cutting live bark. . . . A high percentage of larvae removed by spraying are crushed. . . ."

The time to do this is late fall, early or late winter; or until spring emergence starts. Powell says, "Don't wait 'til spring for you



might not get to it." Growers who have a codling moth problem and a good power sprayer to do the job are urged to try this practice.

## NEW BULLETIN

A new bulletin, No. 519, from the University of Illinois on Codling Moth Control was written by Professor S. C. Chandler. It is a survey of grower practices, control methods, and problems. Every Kentucky apple grower would profit from studying this bulletin. A few copies are available from the Illinois Experiment Station, Urbana, Illinois.

## BROWN ROT AND ITS CONTROL

W. D. ARMSTRONG

Dr. R. H. Daines, Plant Pathologist of the New Jersey Experiment Station, made a very interesting and enlightening talk on brown rot at the recent Kentucky State Horticultural Society meeting at Mayfield, Kentucky. The points he brought out are valuable to Kentucky peach growers. Many of those points are related below for benefit of those not present, as well as a reminder for those who were present.

In parts of New Jersey, as in many parts of Kentucky, brown rot is a serious disease on peaches and plums. The disease appears in the blossom blight stage, as well as on the green and ripening fruits.

The brown rot mummies, which are simply the remains of peaches that were ruined and dried up by brown rot, are the main factor in carrying brown rot over from one year to the next. Also, brown rot is carried over winter in diseased twigs and old fruit stems remaining on the trees, and in cankers.

Brown rot mummies that are left hanging on the trees are considered more dangerous than those that fall to the ground. The reason for this is that the mummies on the tree produce spores from early spring clear on through the season every time they are wet by rain. The early season spores given off by these tree mummies cause the blossom blight stage of brown rot and the spores given off later in the season infect green and ripening fruit at harvest time. On the other hand, the mummies that fall to the ground produce spores only during the early

part of the season. These early spores cause a part of the blossom blight or other early season forms of brown rot. Mummies on the tree or on the ground also serve as overwintering quarters for oriental fruit moth larvae.

The blossom blight stage of brown rot (often serious on Red Bird, as well as some other varieties of peaches, apricots and plums) is harmful because it kills a number of blossoms that might otherwise set fruit, and because the brown rot fungus develops in these diseased blossoms and often enters the twigs, causing some of the new growth to die. The spores that develop in this diseased tissue then serve to carry the brown rot infections along and these later cause infections among the green and ripening fruit. In trees and orchards where brown rot has been serious, a clean-up of all mummies from the ground and trees, and the removal of diseased stems, twigs and wood, is important in reducing the amount of infection carried over from year to year. Insect punctures of the fruit are also important places for brown rot to enter the green or ripening fruits. Consequently, good insect control is a big factor in controlling the brown rot disease.

## CONTROL BY SPRAYS

Where brown rot has not been serious, sulfur sprays or dusts during the last month before harvest are often sufficient to control the disease, and many Kentucky growers have succeeded by following this practice. On the other hand, the varieties and orchards where brown rot is serious and where it starts with blossom blight infections, sprays for the control of the disease must start much earlier. In New Jersey where blossom blight and subsequent fruit infections are annually serious, the Experiment Station recommends an annual pink bud pre-blossom spray of either 1½ gallon of liquid lime sulfur or 6 pounds wettable sulfur per 100 gallons. Where the blossom blight is serious they prefer the liquid lime sulfur at this time and emphasize that this material should be put on only up to the full pink bud stage, because applications of lime sulfur with blossoms open may cause injury. This lime sulfur spray has also been used by some Kentucky grow-

ers with good results. Following this pink bud spray, in problem orchards they recommend a full bloom spray of 6 pounds of wettable sulfur per 100 gallons. Sulfur is also included in every spray through the season thereafter for brown rot control. It was pointed out that the sulfur sprays early in the season reduce the amount of brown rot spore development that would otherwise be carried over to the green and ripening fruits.

Dr. Daines pointed out that during warm, moist weather favorable for brown rot, infection occurs in a matter of one or two hours. This makes it essential that the developing fruit be kept coated with sulfur at all times during the few weeks preceding harvest. When the sulfur applications are weakened or diluted by rains during this period they should be renewed as quickly as possible with spray or dust applications.

The above discussion should make it clear that the control of brown rot is an individual orchard proposition and measures that may be adequate in one orchard would be a complete failure under other conditions. For this reason, each peach and plum grower is urged to study his brown rot problem thoroughly and take all steps necessary to control the disease under his conditions. It is not enough to simply knock the brown rot mummies from the trees. They should be removed from the ground. Where it is impossible to remove the mummies from the ground, a disking just prior to blooming will disturb the mummies sufficiently to cause them not to develop the small brown cup-like fungus growths that produce the brown rot spores from these ground mummies. No such growth develops from the mummies hanging in the trees, since they produce a different type of spore and, as mentioned above, produce these spores in abundance to be spread over the fruit and foliage around them at each wetting during the growing season.

In addition to the earlier sulfur applications applied through the season, it is advised that each grower apply a sulfur spray or sulfur dust immediately before harvest operations. Many growers also find

it advantageous to have a small duster attached to their peach brushing equipment so that a protective sulfur coating can be added just before the fruit is placed into the baskets for shipping.

Many new fungicides are being tried for the control of brown rot and some are showing promise. Until these newer materials have been tested further, are proven and are available, sulfur is the material we must depend on for brown rot control.

## STRAWBERRY VARIETIES IN WESTERN KENTUCKY

W. D. ARMSTRONG

Strawberry variety trials at the Western Kentucky Experiment Substation at Princeton have considered chiefly berries adapted for shipping purposes. However, a number of home-use varieties have also been tried. During recent years Blakemore has usually been at or next to the top in yield among the so-called commercial shipping varieties. In 1946, however, Blakemore stood in third place among the shipping varieties with 119 crates per acre, while Tennessee Shipper was second with 157 crates per acre and Tennessee Beauty first with 180 crates per acre. Aroma, formerly one of the main varieties in this section, produced only 70 crates per acre. Blakemore and Aroma had a higher percentage of rotten berries than either Tennessee Beauty or Tennessee Shipper.

Among the softer berries suitable for home use, Tennessee Supreme was high in 1946 with 201 crates per acre and Maytime, another early home-use berry, produced 124 crates per acre. Tennessee Supreme, very similar to Premier and often compared with it, is a fine quality, dark red berry of good size that is well-adapted for home use or quick-freezing, and has given high yields both at Lexington and Princeton. Maytime is another good quality, soft berry, strictly for home use or local market, that has given consistent, satisfactory yields over several years.

Fairmore is another high quality, dark red berry, but its yields have been unsatisfactory at Princeton. A number of new seedlings put out for trial by the U. S. Department of Agriculture are being tested and



observed for their possible future usefulness.

### FIVE-YEAR VARIETY SUMMARY

Following the 1946 harvest, a summary of yields for the past five years was worked up and, to our surprise, first place among the shipping varieties was held by Tennessee Beauty with an average yearly yield of 185 crates per acre. The Blakemore was second with a yearly

average of 180 crates, Tennessee Shipper was third with 155 crates and Aroma was a poor fourth with a five-year average of only 73 crates per acre. It was also interesting to note that the home use and quick freezing berry, Tennessee Supreme, yielded higher than any of the other four varieties mentioned with a five-year average of 193 crates per acre. A table showing these variety yields by year and age of planting follows:

**Five-Year Yield Comparison Between Five Leading Strawberry Varieties, in Crates per Acre, with the Five-Year Average**

Year	Crop Year	Tennessee Beauty	Blakemore	Tennessee Shipper	Aroma	Tennessee Supreme
1942.....	1st year .....	276	296	240	74	268
1943.....	2nd year .....	257	192	195	101	251
1944.....	1st year .....	93	175	96	63	142
1945.....	2nd year .....	118	120	88	55	101
1946.....	1st year .....	180	118	157	70	201
Five-year average .....		185	180	155	73	193

### VARIETY DISCUSSION

Among the early season shipping berries, it will be noticed from the above table that the Blakemore has a comfortable lead in the five-year average over the Tennessee Shipper at Princeton. This Blakemore advantage seems to be brought about by the extra vigor of the variety which enables it to set a good row of fruiting plants most any season and enables the old fields to come through late summer drouths in fairly good condition. During two very dry summers recently, it was observed at the station and in commercial fields in the Paducah area that Tennessee Shipper plants died out badly after the first harvest while Blakemores survived.

Also, when a drouth follows heavy barring-off of the Tennessee Shipper variety after harvest the variety has been observed to make a poor come-back. For this reason, it is thought that Tennessee Shipper is better suited to simple scratch cultivation of the middles, between the rows, rather than to heavier barring-off practices after harvest. The same thing is true of Blakemore; yet, to a less extent, since it seems that the extra vigor and

hardiness of the Blakemore plants will enable it to stand a bit more abuse. A survey of growers who have tried Tennessee Shipper indicates that the majority are well satisfied with the variety and that they intend to increase their plantings. They report favoring its larger, bright, firm fruit with its low percentage of rotten and cull berries. They also generally like the strong fruiting stem of the Tennessee Shipper that holds the blossoms, young fruit and much of the ripe fruit up off the ground and the mulch. As far as having clean fruit is concerned, Tennessee Shipper does not seem to need a picking mulch as much as the varieties that bear their fruit closer to the ground. Our tests have shown, however, that Tennessee Shipper profits as much from an overwintering protective mulch as any of the other varieties.

In the late berry class the Tennessee Beauty has an outstanding five-year advantage of almost three times the yield of Aroma, formerly the main late season berry of western Kentucky. This difference also exists in the Paducah-Mayfield district where Mr. Leonard Overby of Mayfield has had a three-year aver-

age for his Tennessee Beauty variety of 240 crates per acre compared to a three-year average of 80 crates per acre for Aroma. This high yield, coupled with the fact that Tennessee Beauty is a firmer, more attractive shipping berry than the Aroma and approaches it in size of berry, is ample justification for the fact that a number of growers will try out small plantings of Tennessee Beauty in 1947. If this variety continues to do well in western Kentucky, it could have a bright future in this area where a late berry of the Aroma season has the advantage of coming on the market at the time when the earlier berries of the southern intermediate states are finished. While the Tennessee Beauty has not been observed in as many places in Kentucky as the Tennessee Shipper, it (Tennessee Beauty) generally has produced a good row of plants and seems to be generally superior to Aroma and Tennessee Shipper in this respect. The plants are deep rooted and bear large crops of fruit close to the ground. A straw mulch is needed to help keep the fruit clean.

Summarizing, it seems that Blakemore is the most dependable early shipping berry, to date, and that if the yellows can be kept from the variety and the plants kept from becoming too thick, it will be hard to replace. Tennessee Shipper, about one picking later than the Blakemore, is showing promise as a companion variety to Blakemore and will be planted by a number of growers although to date its average yield has not been up to Blakemore in western Kentucky. Tennessee Beauty is showing great promise as a late variety and, being of the same season as the Aroma, it has a good chance to replace that variety in western Kentucky and is showing promise well up-state. The Tennessee Supreme has given heavier yields than any of the others but it is a soft berry, unsuited to commercial shipping but favored by many for home use and quick-freezing.

### THE PEACH VARIETY SITUATION

W. D. ARMSTRONG

(All varieties mentioned are yellow freestone, unless otherwise stated.)

In Kentucky and the nation as a

whole, Elberta retains its lead as the main commercial shipping peach because it is well adapted and bears heavily in many sections, is a good, firm, shipping peach, has size and reasonable quality when properly handled. On the other hand, its buds are tender to freezes and frost, its fruit is often poor quality when improperly handled and its lateness often makes it subject to attacks of the oriental fruit moth.

Halehaven, a good-quality peach ripening two weeks ahead of Elberta has become the leading one of this season in Kentucky. This variety is hardier in bud and blossom than Elberta, tends to set heavy crops and generally needs heavy thinning. South Haven is still hardier in bud, and ripens with Halehaven, but the tree is tender and short lived and the fruit, while excellent, is subject to cracking and brown rot. July Heath (Othelle) a good quality, white clingstone that ripens about with Halehaven, is doing well generally in Kentucky, and in many quarters is liked for canning and local markets. The July or Burbank Elberta is another of the same season that is gaining favor in western Kentucky and farther south. Sunhigh also comes on at this time and is of highest quality and high color. Goldeneast is a large, attractive, high-quality peach a few days after Halehaven, that is doing well at Princeton and Lexington.

Coming one week after Halehaven is Sullivan's Early Elberta. This is a true Elberta in every respect except that it ripens one week earlier than Elberta. It originated as a bud-sport limb on a regular Elberta tree in central Georgia. Great numbers of this variety are now in production in Georgia, enabling them to ship Elberta peaches a week earlier than formerly. This peach is looking good in western Kentucky. It is probably the best shipping peach between Halehaven and Elberta and will likely take part of the place formerly filled by Georgia Belle, the soft, white freestone that comes just ahead of Elberta, and the old lemon-fleshed Early Elberta. Kalhaven is of this same season also but it seems a bit shy in size. The Redelberta also is meeting disfavor in Kentucky because of its small fruit.

Veteran, a variety from Canada, ripens at this same season and is



one of our hardiest peaches. It is a bit soft and tender for shipping and is not a full freestone. It is suggested for trial where a hardy peach is needed for home and local market use in the colder interior sections of the state.

Coming about three and one-half weeks before Elberta is Golden Jubilee, the best known peach of this season. Golden Jubilee, however, is losing favor as a shipping peach because of its soft flesh, its tendency toward light and late bearing and the fact that it does not resist frosts at blossom time. A firm fleshed peach ripening about two days later than Golden Jubilee is Triogem. This peach is firmer, better colored, has borne heavier at Princeton, is a better canning peach and the fruit hangs longer than Golden Jubilee and it is generally gaining favor. Early Halehaven and Fair's Beauty, semi-cling of high quality, are showing some promise for this same season.

A few days ahead of Golden Jubilee or about four weeks ahead of Elberta is Redhaven, a firm fleshed freestone of high color. A number of trees are in production in Kentucky, chiefly with variety testing cooperators, and it is well liked. The variety has to be thinned early, and heavily and because of its early coloring there is a tendency to pick it too soon. Dixigem, introduced in 1945 by the U. S. Department of Agriculture and now planted but not yet fruited in Kentucky, is of the same season as Redhaven and some think it will be larger.

A hardy, white freestone of this same season is Raritan Rose, which many in Kentucky think is a better peach than the older Cumberland which ripens a few days later than Raritan Rose.

Just a few days after, or almost with Red Bird in ripening, is Erly Red Fre. This peach seems adapted over the entire southeastern section of the United States. It is not always a true freestone and is slightly penalized in quality; however, it is far better than Red Bird and so far has not had the brown rot or blossom blight that hits Red Bird so heavily. For these reasons many are enthusiastic about it as a variety to replace Red Bird, and its use on a small trial basis is suggested.

Coming just after Mayflower and

ahead of Red Bird is Dixired, the new early yellow clingstone introduced in 1945 by the U. S. Department of Agriculture. This is a firm-fleshed peach of medium size. Dixired trees are growing in Kentucky but have not yet fruited here. It is being watched closely and will be reported as soon as it fruits locally.

A number of newer varieties introduced in 1946 from Illinois, New Jersey, Michigan, and the U. S. Department of Agriculture were described in the November issue of Kentucky Fruit Notes. Undoubtedly, some of these will become of importance to Kentucky peach growers. Trees have been secured for trial plantings and reports will be made from time to time.

Varieties in the present variety planting at Princeton that are being discarded because of their softness, lack of hardness, small size, poor quality, disease injury, or because there are other better varieties of the same season are June Elberta (Mikado), Oriole, Early Rose, Gold Aflame, Slappy, Colora, Alton, Red-elberta, Hardee, Sure Crop nectarine, and Compass cherry-plum.

## STOP SCALE INJURY

DR. P. O. RITCHER

With the San Jose scale on the increase in Kentucky orchards many growers need to take drastic action now if they are to prevent an increasing amount of injury to their peach and apple orchards in 1947. Some growers in the summer of 1946, alarmed by dying branches and the large number of crawlers, applied summer oil sprays. These did some good, but if scale is to be kept in check thorough dormant spraying is also needed.

Where scale is abundant the dormant spray should consist of an oil emulsion containing 3 percent actual petroleum oil. This same strength material will also kill European red mite eggs which are apt to be present on apple trees if DDT was used in the spray schedule last year. Growers needing protection from rosy aphid should use an oil containing one of the dinitro compounds.

On peaches the same percent of oil is needed. To control leaf curl the oil should be combined with 4-4-100 Bordeaux mixture. Liquid lime sulfur, 12½ gallons per 100 gallons of

spray can also be used but it is not quite as effective for scale control.

Peach growers wishing to use tank-mixed oil emulsions can emulsify the bulk spray oil with the bordeaux mixture. Apple growers have a choice of calcium caseinate, bordeaux mixture, or one of the commercial emulsifiers. Many growers, especially those with a few trees, will find it more convenient to use one of the commercial oil emulsions or miscible oils.

Apply dormant sprays in the spring before growth begins. If possible, select bright, clear weather when there is little wind. The temperature should be above 45°F.

San Jose scale belongs to a peculiar group of small sucking insects called scales because of the scale-like covering which protects their flattened bodies. It is hard to find a light infestation of scale, but when they are abundant they can easily kill peach and apple trees or greatly reduce their vigor. When numerous, the overlapping scales appear on the twigs and limbs as a grayish scurf.

Young scales are barely visible to the naked eye. During the summer months they crawl about over the tree limbs. They soon settle down and in a short time a scale is formed over each insect. Scale insects have sucking mouth parts and injure the trees by extracting the plant juices.

Dead or dying limbs in the centers of trees and numerous water sprouts are often indications of scale attack. Where scale is abundant much of the fruit often has pinkish scale spots. In one western Kentucky peach orchard this past season 55% of the ripe Elbertas were scale spotted.

## HINTS AND OBSERVATIONS

By W. W. MAGILL

### LET THE OTHER FELLOW WORRY

Several representatives of commercial companies, who attended our State Fruit Meeting at Mayfield in December, advised us that available supplies of spray materials and fertilizer for 1947 were quite limited. If you get your supply now, the shortage will not affect you personally.

### TREES

Some nurseries sold out all their 1947 trees by January 1. Good fruit prices always stimulate the planting of new fruit trees.

### DDT

Unless codling moth have become so serious in your orchard that the worms have been taking your crop in spite of a full lead-arsenate spray schedule, better not use DDT this year. DDT sprays destroy useful parasites but fail to kill mites and woolly aphis, which may therefore become serious pests.

### HISTORY REPEATS

Will apple scab control be your big fruit problem in 1947? Keep in mind that it has destroyed many crops four years out of five for the past 25 years. History generally repeats.

### PEAK PRICES

Strawberry prices for the past 30 years have hit the peak in 5- to 6-year cycles. If this continues, we can expect at least two or three more years of good prices.

### FROZEN BERRIES

We feel safe in the statement that "Frozen strawberries in the future will help materially in stabilizing the market of our commercial berry crop in Kentucky."