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VIRGINIA POLYTECHNIC INSTITUTE

EXTENSION DIVISION

Department of Horticulture

(December 1, 1953 - November 30, 1954)

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COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
VIRGINIA POLYTECHNIC INSTITUTE AND THE UNITED STATES
DEPARTMENT OF AGRICULTURE COOPERATING

STATE OF VIRGINIA

January 7, 1954

V. P. I. AGRICULTURAL
EXTENSION SERVICE

Mr. W. H. Daughtrey, Associate Director
Virginia Agricultural Extension Service
Virginia Polytechnic Institute
Blacksburg, Virginia

Dear Mr. Daughtrey:

I wish to submit herewith a report of fruit growing extension work of the Virginia Polytechnic Institute, Department of Horticulture, beginning December 1, 1953, and ending November 30, 1954.

PERSONNEL

H. B. Aroian, Associate Horticulturist, full time Extension, devoting major time to work with small fruits.

Fred R. Dreiling, Associate Horticulturist, full time Extension, devoting major time to work with tree fruits.

Howard A. Rollins, Associate Horticulturist, one-half time Extension beginning August 15. Mr. Rollins is stationed at the Winchester Field Laboratory.

Wesley P. Judkins, Head of Department of Horticulture, devoting one-third time to horticulture Extension work.

A. H. Teske, Horticulturist, full time Extension .

GENERAL SITUATION

The year 1954 was one of discouragement for the fruit industry of the State. Not since 1950 have the growers faced so many reverses. Beginning with 1935 when production was high and prices low, many growers took serious losses. As a result heavy tree removal and orchard abandonment took place. At the start of World War Two prices for fruit began to

improve at the same time skilled orchard labor became scarce, wages and materials increased in cost rapidly, but in spite of better demand and improved prices many growers found it difficult to continue to operate their orchards. Tree removal continued, especially where the plantings were located on poor and marginal sites. Short crop years in the forties brought encouragement to the industry. Great progress in the mechanization of orchards and packing houses operation to improve quality and reduce costs, together with the expansion in processing brought further hope to the fruit industry, until the disastrous year of 1950. That year many abandoned plantings set a crop, production was increased to such an extent that growers found it difficult to move the crop. Much fruit was wasted, and the industry was in serious trouble. Losses were heavy resulting in a program of tree removal and the abandonment of many orchards.

In 1951 the situation showed improvement. National production was below average. This was true of the whole Appalachian area as well as for Virginia. Processor demand was good and prices improved. Production in 1952 and 1953 was below average. The expansion and demand for processed fruit offered a ready market outlet for a larger volume for the short production.

With three encouraging years many growers who had abandoned their plantings took hope and had begun to take better care of these orchards, so that by 1954 these plantings, barring unfavorable spring weather could well come through with a crop, and that is just what happened. This situation was true for the whole Appalachian area. Spring weather in 1954 conditions were satisfactory for setting fruit and as a result the state came through with a much larger crop than had been anticipated earlier in the year. The production was especially heavy in the upper valley fruit producing areas.

High winds and wide spread hail storms not only caused losses of trees and fruit, but the quality of the fruit was materially affected. To complicate matters for the apple industry hurricane disturbance in the Northeastern fruit sections put a large volume of disaster fruit presumably into the markets which could not help but increase market difficulties for the balance of the crop. Clinking Industry's troubles from weather upsets was the devastating work of "Hurricane Hazel". Coming at a time when a large part of the apple crop was on the trees, especially Stegman and Winseep, made the situation worse. The sections East of the Blue Ridge Mountains suffered the most serious effects of the storm. Since this area was almost in the direct path of the hurricane, trees were burned over by the hundreds with many thousands suffering damage. In many plantings as much as eighty percent of the fruit that had not been picked was blown to the ground and that which was left on the trees was badly bruised. Emergency measures were put into operation in order to salvage as much of the fruit as possible.

It was not possible to interest processors, since these sources of outlets had been and were getting a volume of fruit beyond their capacity, as a result prices for processing apples dropped sharply in fact from \$4.50 per hundred to \$2.50 per hundred. Even at these reduced prices processors were swamped with fruit, making it necessary to cut volume intakes to a trickle, leaving the growers with a large part of the crop without an outlet. The problem was most critical because many growers were without packing house facilities to package fruit.

With cheap apples available truckers became interested and moved a large amount of fruit, this proved a real life saver. As could well be expected, requests for extension services increased sharply.

THE FRUIT SITUATION

Total fruit production in the United States is expected to continue high. This is especially true of all citrus fruits which offer great competition to most all deciduous fruits. Pear production can also be expected to increase. As for apples, while apple tree population has shown a rapid decline since 1940 in all apple growing sections of the country, production has not been cut as sharply as tree population. This has resulted from higher yields per tree, due to improved varieties, better production practices and the fact that the present acreage is located on better sites. Tree removal is expected to continue, but at a reduced rate. Production is expected to decline, but at a relatively slow rate. What is true of apples is expected to hold for peaches.

In spite of fruit industry reverses in 1954, the outlook for the future is promising. The rapid increase in population, and nutrition trends should tend to make for greater consumption of fruit. With the progress that has been made in appearance, quality, and handling fruit for fresh use, demand for fresh fruit can be expected to increase. Progress in the development of new fruit products has resulted in a sharp expansion for processed fruits. With continued high industrial employment, together with high cost for domestic help and the new ways and methods of handling, fruit products should make for continued expansion and use for processed fruits.

APPLE PRODUCTION

Apple production for the United States in 1954 amounted to a little over 103,770,000 bushels as compared to the 93,307,000 bushels in 1953 and 92,489,000 bushels in 1952. The 1953 and 1952 production was materially

below the previous ten year average of 105,802,000 bushels. While the crop of 1954 was larger than either the 1953 and 1952 crop it was still below the average of 105,802,00 bushels. With the heavy decline in apple tree population, it is not expected that the near future crops will go much above the average figure mentioned even under favorable weather conditions. It appears that unless interest in new plantings is sharply upped that the production of 123 million bushels of 1950 will not be reached for sometime. Production of apples can be expected to be more stable in the years ahead.

Low temperatures in the spring of 1954 cut crop prospects in the western and midwestern producing sections. Dry weather and large production in 1953 held production down in some of the eastern apple producing states. The increase in the 1954 crop occurred in the Carolinas and the Appalachian areas.

In Virginia the serious drought in 1953 was for the most part responsible for the extremely short crop of 6 3/4 million bushels in 1953. Weather was favorable for fruit bud formation in 1953 and with good weather for setting fruit in the spring of 1954 and the fact that many neglected orchards came through with a crop has resulted in a production of nearly eleven million bushel of apples harvested. It is estimated that the total crop would have exceeded twelve million bushels had it not been for damage from wind and hail storms.

The quality of the Virginia crop was above average for size and color. There was a considerable amount of fruit of poor quality due to hail, wind and over maturity. Apple tree removal is still continuing in the State. Short crops in 1953 and 1952 with better prices and the high cost of tree removal were important factors in slowing up tree removal. In 1954 a

considerable number of new plantings were made which it is expected will help maintain production when these plantings come into bearing.

PEACH PRODUCTION

Peach production of 60 3/4 million bushels in the United States in 1954 was considerably below the 1953 production of 64 1/2 million bushels and sharply smaller than the record crops produced in the middle forties. Three factors are primarily responsible for this decline: First, unseasonably low temperatures in 1950 and 1951 in many peach growing sections causing serious damage to trees. Second, low prices in years of high production. Third, high production costs. It appears that peach production will show further decline unless new plantings are made more rapidly.

In Virginia the trend in production is downward as is indicated by the following crop figures: In 1951 Virginia produced 1,771,000 bushels; in 1952, 1,909,000 bushels; in 1953, 1,240,000; and in 1954, 1,500,000 bushels. These figures, when compared with a crop of 2,640,000 bushels produced in 1946, indicate the trend.

In Virginia the decline in production is not due to extensive tree mortality, from low temperatures, but to tree removal on poor sites; damage from late spring freezes; and variety competition from other areas.

APPLE MARKETING SITUATION

Virginia apple growers have been faced with a difficult market situation in finding an outlet for their nearly eleven million bushel crop. Early varieties such as the Double Red Delicious and Jonathon found a ready market at satisfactory prices. These varieties were favored with a good demand due, to a considerable extent, to the fact that the north-west harvest season was some ten days later than normal. The problem of



: NO WASTE IN THIS CIDER PLANT AS THE :
: POMACE IS HAULED OUT TO THE FIELD AND :
: FED TO LIVESTOCK :

marketing the later varieties beginning with Grimes Golden has been most difficult. Several factors have contributed to the situation: First, a volume of fruit that was more than one-third larger than for the previous two years. Second, more than a third more apples from adjoining production areas, offering the greatest kind of competition. Third, inadequate packing and storage facilities. Fourth, competition from disaster fruit from distant areas. Fifth, insufficient processor outlet.

It is difficult to expand market outlets for a large volume of extra production, especially when competitive areas must do likewise. The situation is especially alarming when packing and storage facilities are not available to accommodate the needs. Apples are a perishable product and must be moved rapidly either into consumption or storage. The situation would be difficult under normal conditions, but when unforeseen supplies of poor quality move into the markets at lower prices the solution becomes almost impossible. While processor had little carry over, stocks from the previous crop, and with intensions of increasing their demand by ten percent the outlook at the beginning of the season appeared encouraging, but what does a ten percent increase in demand help in a situation where there is a need for an outlet that will take fifty percent more fruit.

The market roads are still not clear because storage holdings are up several million bushels. A considerable amount of the fruit does not have normal storage life. So the apple market situation picture is not too clear at the present time.

PEACH MARKET SITUATION

The market situation for Virginia peach growers was fairly satisfactory. While the harvesting season was a week earlier than normal, ordinarily this

would mean greater competition from the important southern peach producing states, but in 1954 these areas were also earlier and this together with the fact that both the Carolinas and Georgia are growing more of the early varieties so that these areas have passed their harvesting peak when peaches from Virginia were ready for market.

The demand for Virginia peaches was good, considering that size had been affected by the prolonged dry weather, and prices were much improved over the previous two seasons. The fruit had high quality. It also carried well into the markets since the harvesting was not marred by rains.

DEMAND AND PRICES

Apples - The demand for early apples was strong and active. Virginia had an unusually good crop of Red Delicious and with the harvest season in the northwest late, growers had an opportunity to move this variety without difficulty, at satisfactory prices for quality packs. Storage holding of this variety is not large, but prices have been lower and demand not too active. Indications are that prices will not be much stronger even for late season storage holdings.

There is a demand for later varieties during the early marketing season, especially for quality packs having high color. The active demand slowed as large supplies became available. Prices were well maintained. There is some indication that prices have weakened for storage offerings and with larger storage holding it is doubtful if there will be any strengthening of prices.

Great difficulty has been experienced in moving the large volume of varieties that generally find an outlet to processors as well as for the poorer quality apples, of which there was a large quantity due to hail and wind and for unharvested apples that were subjected to early low temperatures.

While processor demand was heavier than in 1953 the larger crop made it impossible for this outlet to take care of large volume that was offered.

Prices for processing apples were about the same as in 1953 at the beginning of the season. However, prices were cut sharply later when intended packs had been attained. This left growers with heavy supplies for which there was no demand, even at one-half of the early prices. As mentioned, processor prices early in the season were well in line with those paid in 1953. Yorks and other top processing varieties started out at \$5 per hundred for 2 1/2 inch number canner and \$4.50 per hundred for other varieties. This price dropped to \$2.50 per hundred in October.

Truckers proved a life-saver. They bought apples at very low prices, but they moved a large part of the crop.

Peaches - Generally in years when the peach harvest in Virginia is early growers find greater competition from the southern peach producing areas. However, in 1954 the southern areas had passed their peak movement before the harvesting season in Virginia started. This together with the fact that the southern states have planted early varieties rather extensively reduced the quantity of peaches that were being harvested during the Virginia movement period. The peach crop in Virginia was short and growers found a ready demand for their fruit. Most of the important peach growing sections of the state suffered from dry weather. Peaches did not develop good size and prices were somewhat lower than in 1953.

ADJUSTMENTS

Unusual crop and weather conditions made it necessary for a number of adjustments in the 1953 fruit extension program in order to assist growers with emergency problems. Virginia had a small crop of apples in 1953, as

a result of later spring freezes that reduced the set materially. Prolonged dry weather during the growing season reduced the size of the fruit. While growers received satisfactory prices, the high unit cost of production left little surplus cash on hand with which to finance the 1954 crop. The serious drought in 1953 meant that the trees would be in a weakened condition to produce the 1954 crop, so it was necessary to spend more extension time on cultural programs that would help the trees to restore vigor.

With a larger crop in prospect, operations that would improve quality were stressed. Pruning was given special attention. Thinning is most important to promote size, more annual bearing and reduce the quantity of small fruit. Accordingly more attention was devoted to chemical thinning. Since hand thinning is too slow and costly work on the spray project was adjusted to meet the needs for lower costs and for the control of insects and diseases. The changes made in the spray program required more individual grower contacts.

Early in the season with favorable pollination weather gave indication that national production of apples would be considerably above average. Later the northwest experienced critical low temperatures with the result that prospects for a large crop in the northwest were reduced. In Virginia and in the whole Appalachian area conditions for large production remained favorable. Weather including a good moisture supply made prospects more of a reality for the crop to exceed a twenty-two million production for the area. With high production in sight emphasis was placed on ways to assist the industry in reducing costs, saving labor, and at the same time produce fruit that would increase demand and consumer preference. A state-wide epidemic of fire-blight occurred and much effort was devoted to methods of control for this disease. Hail storms were more serious and widespread making it necessary to spend more time in assisting growers.

In 1953 with a short crop on the trees, generally in all apple growing section of the state, there was little need for preharvest spray, but with a large crop to harvest in 1954 the problem of getting the fruit picked on time became serious, making it necessary to stress preharvest sprays.

Up to 1954 there had been little interest on the part of the industry to make new plantings, but with the beginning of 1954 many requests from growers for information on varieties, dwarf trees, and planting methods were being received indicating that a considerable number of new plantings was being contemplated. To avoid mistakes made in varieties, site selection and arrangements of varieties to insure proper ~~cross~~ cross pollination the fruit extension program was adjusted in order to give more attention to assisting the industry with these factors.

MAJOR PROJECTS IN 1954

The soils and climate of Virginia are well adapted to the growing of apples, peaches, cherries, plums and pears. Virginia's production is strategically located from the standpoint of market outlets. Virginia has the further advantage of being located in and adjacent of the largest fruit processing centers, which is of great importance as an outlet for fruit that does not meet ready consumer acceptance as fresh fruit.

One of the most important long time objectives of the fruit extension program has had for its aim to improve and stabilize production, to maintain the state's position as a profitable fruit industry. Experiences have indicated that old, marginal orchards and miscellaneous varieties are not in accord with the objectives in mind as a result tree removal and abandonment has continued at a sharp rate. Tree removal has reached a point where it is causing considerable concern, not only among growers but to the allied

industries, especially to the processors. Regardless of concern, removal of trees that have reached the unprofitable age, trees that are on marginal sites and trees of undesirable varieties is not desirable for an efficient fruit industry. It is important that new plantings be encouraged on a rather large scale. Progress is being made and because of the importance in line with the long time objective the planting project received major attention in 1954.

Improvement in fruit quality, handling and packs is included in the major projects. Virginia growers are in an advantageous position in putting up a pack of apples, because of the processor outlet they enjoy for the fruit that does not demand consumer preference. This outlet makes it possible for growers to put only the best fruit into their fresh fruit packs, thereby, being able to meet competition without such loss in return.

The net work of local grower organizations has made it possible to greater work together among growers and to reach the greatest number of growers with the fruit Extension program. This organization work is considered one of the major projects of the Extension program.

SPRAY PROJECT

Spraying has always received major emphasis in the fruit Extension Program. Added time was given to this project in 1954. Great progress has been made in the development of insecticides, and fungicides. Insecticides for more efficient control of insects, fungicides assure better control of diseases, improve yields of fruit with higher finish and size. Extensive changes were made in the 1954 spray programs. Spraying is the largest item of expense in growing a crop of quality fruit. The new

fungicides and insecticides are high in cost, making it necessary that they be used properly to secure full advantages at the lowest possible dollar outlay. The spray programs in 1954 were perhaps more complicated and with the great improvement that has been made in spraying equipment and the high cost of these modern machines, spraying becomes an operation of more exactness if maximum results are to be attained at minimum costs. More time was devoted to the spray project in 1954 in order to give greatest assistance to the industry to make the programs most effective and efficient. In addition, much time was devoted to demonstrations to secure more information with several in materials and to further test the scheduled spray programs including concentrations, combinations and compatibility.

There is some indication that the fungicides and insecticides have increased the problem of control of certain diseases, for example mildew is becoming more prevalent, partly because of the fact that perhaps the growing of varieties more susceptible to mildew have been planted, but the absence of less sulfur in the programs may be an important contributing factor. Again fire-blight appears to be becoming more prevalent. Demonstrations for listing materials for the control of these troubles were more extensive in 1954.

The regulation of tree fruit load is vital to stabilized production and better fruit size. One of the important ways of regulating fruit load is through thinning. Hand thinning is slow and costly to secure full benefits from thinning. Spraying with chemical sprays offers a solution to this problem. Real progress is being made in this field. Through demonstrations and experiments recommendations can be made for a number of apple varieties. With developments of chemical thinning spray and stop-drop sprays, the spray project is continually being expanded and is becoming a project of ever growing importance.

PRUNING

In the days w en small apples found an outlet in foreign markets the production of undervalued fruit was not a marketing problem. Pruning was not such an important orchard operation. However, with exports reduced to a mere trickle and the industry becoming dependent upon domestic markets for almost all of their production, ways and means for reducing the quantity of small apples become very necessary. In recent years the consumer preference for fruit of large size, high color, finish and quality has increased to such an extent that small fruit is hard to sell. This, together with the need for better annual yields and greater mechanisation in spraying and other orchard operations, has made proper pruning of vital importance. Changes in pruning and adapting methods to improve quality, reduce production of small fruit and make possible good spray coverage with the new spraying equipment has to be developed.

The objectives of present day pruning are firstly, since fruit color is all important and light is the most important factor in securing high color the distribution of the fruit wood in such a manner as to secure adequate light throughout the bearing surface; second, for trees to produce large fruit vigor is essential. Proper selection of fruit wood is needed to promote high annual yields; third, tree structure to permit economical harvesting and spraying is vitally fourth, labor is too scarce and wages are too high to depend upon the pruning operation to be carried on with hand prunings; fifth, spray materials used in present day spray programs are too expensive to be wasted on wood and foliage that are only able to produce small and poorly colored fruit. These factors have made it necessary to stress power pruning and to interest growers in adapting prunin' methods that will meet the new conditions of production and marketing.

ORCHARD MANAGEMENT

The first requisite to profitable fruit growing is to secure good annual yields, to accomplish this requires good orchard management. The older the trees, the more important becomes proper feeding, management of the soil, proper cover crops and proper handling of the cover crops in order to keep the trees young and vigorous. These factors must be taken into consideration, soil reaction, moisture supply, temperatures in the feeder root zone and availability of raw food materials. The method of handling cultural practices governs to a large extent the size of the fruit, color, finish and quality. It governs to an important extent conditions in the root zone, which allows the root system to function at its best for the intake of moisture and raw food elements. Orchard soil management is especially important as trees get older and following the dry year of 1953 more attention was given to this project in 1954.

RODENT CONTROL

Pine mice continue to be one of the most serious problems of the fruit industry. Tree losses were especially heavy in late fall of 1953 and during the winter and spring of 1954. The lack of a succulent food supply because of the dry weather no doubt was a contributing factor. While rodent control by the use of poisoned baits is satisfactory under conditions of proper weather and careful and frequent placing of baits, to do a thorough job takes time and at the same time is so expensive that few growers devote sufficient time to such a program. There is urgent need for a more effective and economical mouse control program. Ground spraying offers great promise, but requires extensive demonstration to iron out the many questions and risks that might attend such a method. Much time was

devoted to this project in 1954 not only in getting growers to adapt a more extensive poison program, but in assisting growers in repairing damaged trees.

HARVESTING AND MARKETING

With increasing demand for better quality and condition in fruit more attention is being devoted to this project. The increased production in 1954 added further emphasis to this work. Since the industry can no longer depend upon local labor for harvesting fruit crops it has become necessary to use more outside labor. Much of this labor has had little experience in picking fruit. Such labor does not appreciate the importance of handling fruit carefully. It does not appreciate the need for handling picking equipment such as ladders for safety.

Unless plans for a labor supply are made well in advance of the picking season, the supply of labor may not be adequate to harvest the crop at the proper time or if too large a force is engaged or contracted for it, may entail unnecessary expense. The industry needs more information on production, time of harvesting and advance information on the kind of weather that can be expected during the harvesting season.

This year considerable time was devoted to harvesting and marketing as a result of damage caused by Hurricane Hazel and the fact that much fruit had not been harvested when the first period of cold weather occurred.

Many meetings were held and demonstrations to teach pickers the proper method of handling ladders and other equipment. It included teachings in removing fruit from the tree, in pouring fruit into crates as well as handling fruit in the process of moving it from the orchard to the packing houses. New factors and changes are entering into the grading and packing

problems each year as merchandising methods take on new angles, including containers, consumer packages, and improved methods of handling. The volume of red strains is rapidly increasing in the state and should make it possible for growers to grade and pack to a higher standard of color.

Virginia growers are rapidly recognizing the importance of the trend in improved standards of grade and pack.

Handlers of fruit are pressing for containers that will insure greater ease of handling fruit, for containers requiring less space and that will provide greater protection to the fruit against bruising, making for better fruit condition and appearance.

In the extension program on Grades and Packs considerable time has been given in securing information on the performance of new containers, their adaptability and acceptance.

The trend to consumer packages is sharply upward. Packaging machines are now available to growers and a number of these machines are now in operation. This equipment makes it possible and convenient to perform consumer packaging at the source of supply. Like the barrel, the bushel basket as a container is being rapidly replaced by the northwestern box and box carton.

PACKING HOUSES

The rapid trend in the use of boxes, box cartons and other containers which lend themselves to count packs, makes it necessary to have sizing equipment that size the fruit to narrower dimensions in order to secure compactness and uniformity. Sizing machines used for barrels and baskets are not suitable for sizing fruit sufficiently uniform to put up a desirable count pack.

Many growers have not been in a position to adopt box packing and as

As a result these growers have depended upon processors as the main outlet for their fruit. With large crops of 1954 and the fact that processors were unable to accept all offerings of fruit, these growers had a serious handicap in disposing of their crop. Growers with small and medium size plantings were at a greater disadvantage.

COLD STORAGES

With heavy tree removal the need for cold storage space has been materially reduced. Commercial cold storages have found it difficult to operate at a profit, especially in years when apple production was short. As a result they have found it necessary to turn to other commodities. The demand for storage space for frozen items, dairy products and meats has made it necessary to limit the space for apples. With high apple production adequate storage space for apples was not available. Growers were forced to find storage space in other areas, which added materially to their expense. Rapid handling of fruit as it comes from the trees, through the packing house, into cold storage and during the storage period is of utmost importance to good storage life and in maintaining top condition of the fruit.

It is important for long fruit life to remove the heat rapidly from the fruit as soon as possible after it is picked. Many storages do not have sufficient refrigeration to remove heat fast enough during periods when a heavy volume of fruit moves into storage. This was especially the case in 1954 when the demand for storage space was great and space was limited. The storage rooms were filled to the utmost capacity, inhibiting circulation and delaying heat removal.

FRUIT PRODUCTS

This project is becoming of greater importance each year. The processing

industry is most vital to the fruit industry of the state. It not only provides ready outlets for a large volume of fruit, but what is most vital to the growers is that it uses fruit that has poor color and is not desirable for fresh fruit markets. This outlet offers an opportunity for apple growers of the state to put up a superior fresh pack that will better meet the ever growing competition.

The question may well be asked: How would the prices of apples in the fresh fruit markets be affected if the growers were forced to put into the fresh fruit market several million bushels of apples that have poor color, minor insect and disease blemishes?

The processing industry has made outstanding progress in expanding markets, in developing new products and improving the quality of their more standard items. Like the producers, processors are confronted with high production costs. Their standards for apples has been improved by the adoption of grade standards, all of which should be of advantage to the grower directly and indirectly.

If the processing outlet is to be maintained it is very important that the processors are assured of a constant and adequate supply of apples. The experience of 1954 makes it necessary that even greater effort be devoted to this project.

LABOR

With high industrial employment the fruit industry's labor problem becomes increasingly serious. The nature of fruit growing necessitates a fluctuating labor supply on a seasonal basis with the greatest need for a large amount of labor during the harvesting period. The fact that fruit growers are unable to compete with industrial wages makes it very hard for the industry to be assured of an adequate labor supply when it

is most needed. The growers can no longer secure a dependable supply of labor.

Starting with World War II the industry has rapidly developed a labor program making use of labor from the migrant stream, so at the present time most of the peak labor loads are met from these sources.

The program presents problems of housing, feeding, training, supervision, transportation, sanitation and health. However, with the construction of permanent camps the program is making good progress. The improved facilities are attracting a better type of labor.

FACTORS DETERMINING MAJOR LINES OF WORK IN 1954

The long time objective of the fruit Extension program is to promote and maintain a profitable fruit industry in the state. To accomplish this aim requires careful consideration of many factors such as trends in production of competing fruits; changes in consumer food habits; changes in production methods; varieties; merchandizing methods; containers; packaging; markets; production costs; etc., all of which affect and determine the phases of work which will contribute most in serving the industry.

Tree Removal and New Plantings - The large decline in fruit tree population in the state has reached a point where it is becoming of great concern to the adult industries, especially to processors. The situation has reached a critical stage, and processors are now planning a planting program of their own in order to provide for adequate supplies in the future. Tree removal is still taking place on a rather large scale, and in many instances orchards are being taken out that are well located and should remain in production, on the other hand there are still plantings which because of old trees, poor varieties, and poor sites should be removed. The time is at hand when new plantings are urgently needed if a profitable fruit industry is to be maintained in the state. Efforts to interest growers are beginning to bear fruit. The

whole problem centers around the wise removal of trees, the selection of good sites for new plantings; varieties; and suitable sites. Since the success of the industry is upon these factors, much attention was devoted to this project in 1954.

Pruning - The history of pruning fruit trees in Virginia presents an interesting study and shows the need for changes to meet economic and marketing developments. In the early days of the fruit industry little attention was given to pruning, height of trees, breakage and fruit quality was of no great concern. Later when export markets were opened up, and the need for cleaner fruit developed, pruning was more important, but since the export markets desired small apples and color was not important little attention was given to methods of pruning that would promote size and color, but attention was given to height of trees to facilitate spraying.

In the twenties when export markets faded and the industry became almost entirely dependent upon domestic markets as an outlet for the production, pruning took on greater importance. With strong competition, consumer preference for larger apples of higher color and free from insect and disease blemishes together with higher production costs, the need for adjustments in pruning became necessary.

Today, Virginia growers must depend upon domestic markets almost entirely for outlets for their fruit. Consumers in these markets want big apples. They want red apples that have finish and are in good condition. Proper pruning is one way of producing the kind of fruit that the markets want.

High production costs and the development of automatic spraying equipment has made it necessary to adapt pruning methods that will meet the present day needs.

Spraying - With the large fruit crops in prospect greater efforts were devoted to the spray project in 1954. The spray project was divided into three parts.

First, in years of heavy production insect and disease control is of increased importance. When trees are carrying a heavy load of fruit it is more difficult to secure thorough spray coverage. Spray programs have an important bearing on yields and finish of the fruit. Spray materials developed for this purpose are expensive and economical use of these spray materials depend upon proper preparation of sprays, timing and applying the sprays.

The second part of the spray project has to do with thinning fruit with chemical sprays. Thinning is absolutely necessary to promote annual high yields. Hand thinning is not adequate since it is too slow and costly. With the great need for thinning in 1954 greater emphasis was placed on the part of the spray project.

Third, in years of large crops it requires more labor and a longer period of time to harvest the crop. Unless the growing season has been favorable and moisture is in good supply coloring of the fruit is delayed. To protect the crop against waste from dropping and to insure better color preharvest are most important.

Orchard Management - Serious dry weather conditions prevailed in most of the fruit producing areas of the state in 1952 and 1953. Tree condition suffered.

Tree performance is dependent upon strong, vigorous growing trees. Large dark green leaves functioning to top capacity is especially important if the trees have been weakened and have set a heavy crop of fruit. Most apple growers are using a sod system of culture. This cover crop offers great competition to the trees for raw food elements and moisture. In 1954 an adequate feeding program and proper cover crop management to provide the trees with a good supply of food and moisture was especially needed and to this end this project was of major importance.

Marketing - A quality product and a constant supply are essentials for success in marketing fruits. In this connection stability in production is of great

importance. The short crops in 1951, 1952 and 1953 found a ready demand without the need for careful planned market programs. Under such conditions growers may take too much for granted when production is large. Again it is difficult to expend outlets in one year without considerable planning well in advance of the harvesting season.

CHANGES AND PROGRESS IN MERCHANDISING

Methods including containers, consumer packages and methods of handling make it necessary to give greater attention to secure more information on market needs, on varieties, time of harvest and probably supplies.

To find outlets for a large crop cooperation of buyers and handlers is of the utmost importance for greater and wider distribution. To avoid possible difficulties that the industry experienced in marketing the large crop of 1950 the Extension Staff felt that the work on marketing should receive more attention in 1954.

Fruit Storage - To create and maintain consumer interest in fruit a constant supply of high quality is needed. High quality is dependent upon appearance and condition. Fruit is highly perishable. To keep it in good condition requires proper storage temperatures, humidity, and careful handling.

From the standpoint of dollar cost investment the growers have a lot of money tied up in every bushel of apples that goes to storage and unless the fruit is properly handled during its storage period heavy losses may result both from the loss of poor fruit condition and also from dissatisfied purchasers.

Rodent Control - Loss and damage from infestation of rodents, especially mice mean lower yields, increased costs and inferior fruit. Damage was especially high in 1954. And since mice cost the industry thousands of dollars each year it is necessary to devote considerable effort to this project.

Grades and Packs - Rapid changes are being made in fruit merchandising. In recent years the demand for box packs has made rapid progress and in 1934 many buyers would not accept baskets. Many new box containers are being developed. This, together with the ever increasing use of consumer packages, and the need for improvement in inspection and grades, has required more effort on the part of fruit extension workers in assisting growers in the field of his project.

Surveys - One of the most important features of the extension fruit program is that of securing information relative to keeping the industry informed on every phase of production, marketing, insect and disease activity, fruit development, harvesting, storage holdings, and removals. To secure such information many surveys are made each year.

METHODS USED IN REACHING THE 1934 GOALS

Many methods and combination of methods were used in carrying out the extension program with the county agent's office as the contact center. Under present modern methods of marketing and distribution every fruit planting is not only a production plant, but also a manufacturing and merchandising institution. Each has its particular problems requiring different methods of approach and treatment.

Cooperation and coordination is necessary to best meet the needs of the hundreds of orchardists. Group action is vital to this end. It makes possible for growers to assist each other. Local grower associations makes possible wider use of group and field meetings. The network of local fruit grower organizations has made it possible to secure greater participation in the fruit extension program.

While the county agent's office has been the center for carrying out the program, the cooperation and assistance of other agencies and groups are

used to the greatest possible extent in planning and carrying out the program. Demonstrations were used extensively in securing information and to get information in the best usable form to the growers and the many allied partners of the fruit industry. Result and method demonstrations were used widely in 1952. Twilight orchard and field meetings were an important feature of the past year's program. Visual aids including movies, T.V., posters were used extensively, together with tours and a large number of conferences.

Manufacturers of orchard equipment, spray materials, storage operators, fruit dealers and handlers by their cooperation have contributed generously to the program, in furnishing equipment and materials for demonstrations. Radio, bulletins, circulars, leaflets together with news articles and illustrative material were widely used in carrying out the program.

COOPERATION

In carrying out the 1954 extension program the department of horticulture has had generous cooperation of the research, teaching and extension staffs of many departments and agencies. The departments of plant pathology and entomology have cooperated fully in the preparation of the spray bulletin, spray service, fruit schools, meetings and survey. Members of the agricultural engineering department have given assistance with storages, packing houses, irrigation, and water problems.

The soil conservation service has worked closely with the fruit extension staff in laying out new plantings on contours and providing information on soil types. In 1954 the Extension Service had the valuable help and cooperation of the Virginia Food Council, independent and retail chain store operators in conducting marketing clinics and in other phases of selling and distributing fruits and in providing information on containers, consumer packages and varieties.

Processors have given valuable cooperation in working out growers processing problems. Cold storage operators have given generous assistance in assisting in locating storage space, in improving storage conditions in handling fruit and supplying information on storage holdings, condition of fruit and movement.

The Extension Service has also enjoyed the fine cooperation of the Virginia State Horticultural Society, local fruit growers associations, the Virginia State Apple Commission, the State Department of Agriculture, the Virginia State Inspection Service, the National Peach Council, the United States Department of Agriculture, the United States Weather Bureau and many other agencies, groups, and individuals.

DISCUSSION OF RESULTS

During the year 1954 the personnel in tree fruit extension traveled 34,023 miles, not including the miles traveled by Dr. W. F. Judkins, head of the Department of Horticulture, who devotes one-third time to extension work in fruits, vegetables and ornamentals. It does not include the miles traveled by Dr. Howard A. Rollins, who came with the department in August of 1954 and who is located at the Winchester Field Laboratory in Winchester, Virginia. The small fruit report is covered separately and will include the mileage traveled, but is not included in the above figures.

The personnel spent 311 1/2 days in the office and 256 days in the field. These figures again do not include the small fruit work, nor that of Dr. Judkins and Dr. Rollins. During the 1954 period visits were made to more than 660 tree fruit plantings. Tree fruit Extension Specialist took part and attended 265 meetings. More than 270 conferences were held with county agents, growers, research workers, processors and a number of different agencies and organizations.

In 1954 a large number of interviews were held with manufacturers and dealers of spray materials, processors, fruit handlers, storage operators

and fruit retailers. Method demonstrations were more extensively used in 1954 due to the heavier crops in prospect and the importance of stressing important changes in operations and practices. One hundred and sixty-two method demonstrations were conducted in pruning, thinning, planting, mouse control, grafting, harvesting, grading and packing and methods of treating hurricane injured trees. In addition a large number of method demonstrations were given to assist individual growers with particular problems.

In 1954 more than 130 result demonstrations were conducted. Many changes were made in the 1954 spray programs and it appeared advisable to test these spray programs in different parts of the state to this end. A large number of result demonstrations were carried out with spray materials for insect and disease control; to secure further information on their influence on set, finish and color. With thinning becoming more important result demonstrations with chemical thinning sprays were conducted in 18 orchards. Nine result demonstrations were conducted for fire-blight control with antibiotic chemicals. Many result demonstrations covered fertilizers, cover crops management, pruning, mulching young and bearing trees with tobacco stems, concentrate spraying, brown rot control on peaches, and sub-scoring, standard and dwarf tree planting. Ten ~~area~~ fruit schools were held and nine picking and harvesting schools.

During 1954 twenty-four surveys were made covering fruit prospects, insect and disease conditions, storage holdings, maturity of apples and peaches to determine picking dates, etc.

ORGANIZATIONS

An important feature of the tree fruit extension program has been the organization of a network of area fruit growers associations. Soils and climate vary greatly in the different fruit growing districts of the state.

Insects and diseases of both apples and peaches are affected by weather. For example Brown Rot of peaches is much more serious in the humid sections in the eastern part of the state than in the areas inland. Cultural and fertilizer requirements vary with climate and soil types.

With local associations in all of the important commercial fruit growing areas of the state it is possible to reach a large number of growers, thereby, making the extension program more valuable to the industry. These organized groups enable growers to collectively solve many pressing problems such as harvest labor. The organizations give extension and research workers an opportunity to meet with growers more often. They provide a better means of keeping growers informed of latest developments in production, marketing, merchandising, packing, harvesting, crop prospects, weather and insect and disease activity.

It requires group action on an area basis to plan labor programs, provide labor, labor camps, securing camp facilities and many other means of assistance that could not be worked out by individuals. At the present time there are nineteen active fruit grower associations in the state. Most of these groups have program planning committees which meet with the extension staff in fruit growing and other groups to plan an extension program that will best meet the needs of the area or county. During 1954 these associations held 126 regular meetings and 9 special meetings. They sponsored four orchard tours, 12 field meetings, six twilight orchard meetings, eight fruit schools and ten harvesting schools. One of the most important undertakings of these groups was the four-state tours when more than 550 growers from a large number of adjoining states spent a whole day in the state.

NEW PLANTINGS AND TREE REMOVAL

The results of this project were outstanding in 1954. The heavy decline

in fruit tree populations has caused serious concern both on the part of processors and growers that it seemed advisable to plan a planting growing which would have for its objective the maintenance of tree population and to stabilize production. To this end consideration was given to a planned tree removal program. The objectives of such a program were first, through local area planning committees to encourage the continued removal of unprofitable varieties; second, taking out old trees that had passed the profitable production age; third, removal of tree located on marginal sites; and fourth, maintaining trees of good varieties and those that were planted on good sites. The second phase of the program was to encourage new plantings. Through this project guidance is given on tree removal, selection of sites for new plantings, proper varieties, proper arrangement of varieties to secure adequate pollination, methods of planting, and care of new plantings. The importance of this project is best appreciated when tree population figures are considered. In 1937 there were 4,153,000 apple trees in the State. At the beginning of 1954 there were less than 2 1/4 million apple trees in the State. In 1937 there were 1,183,775 peach trees in commercial plantings, today there are less than 900,000 peach trees in commercial plantings.

During 1954 site selection committees with the help of the fruit specialists surveyed more than 45 new planting sites. Six orchard site scoring demonstrations were conducted at these demonstrations. The growers are given scoring sheets and after a detail discussion of the essential elements that should be given consideration in selecting a fruit planting site those in attendance are required to score several sites. In this way growers have an opportunity to study sites in detail and are in a position to better judge planting sites. It is estimated that more than 70,000 apple trees were planted in 1954. In addition five demonstrations were given in planting trees. Two result demonstrations were established in mulching young planted tree with tobacco

stems. Two new dwarf tree plantings were established and should provide much need information covering dwarf trees.

NEW PLANTING ACCOMPLISHMENTS

Orchard Sites Surveyed	47
Estimated Number of Apple Trees Planted	70,000
Site Scoring Demonstrations	6
Planting Demonstrations	5
Mulching Demonstrations	2
Dwarf Tree Plantings	2
Result Demonstrations in Sub-soiling	110
Advisory Visits on Planting	22

SPRAY PROJECT

This is perhaps by far the most important project in the fruit extension project. Increased efforts were devoted to this work in 1954. There were four main reasons why greater efforts were advisable: First, large production making it most important to produce fruit of high quality. Second, high cost of spray materials used have a great effect on set, yield and fruit finish. Fruit finish being especially important in securing better appearance spraying is essential. This new spray chemical is expensive and this makes spraying more expensive than ever. In order to secure the greatest benefits at the same time to prevent undue expense the spray programs must be used most efficiently. Third, improved fruit set requires adequate annual thinning to insure high annual production; Fourth, the important to preharvest sprays.

With a large crop of apples in prospect for the State and a large production for the United States a special emphasis was placed on producing fruit of good size, high color and quality. Three spray programs were offered and

cost information was prepared for each program so that growers who were planning to sell their fruit to processing outlets could make some savings in spraying costs.

To further reduce spraying costs result demonstrations have been conducted over a period of years in which dormant and delayed dormant sprays were omitted. The results from these demonstrations indicate that dormant and delayed dormant spray applications are not necessary, especially where scale is not a problem. Thus, making it possible to effect substantial savings.

Cedar and Quince Rusts

Weather conditions were favorable for rust infection. These diseases are much more serious at the present time since the discovery of Ferbam sprays as a specific for both cedar and quince rust control. The cutting of cedars which are the host for both rusts, cedars have become more plentiful and provide for greater spread of these diseases. Certain varieties are rather sensitive to Ferbam and careful use of the material becomes necessary to avoid injury. A series of result demonstrations were set up in order to secure information on concentrations, spray combinations, and compatibility of different materials. Excellent results were secured when Ferbam and Mercury, Captan, Mercury and Ferbam and Glyodin, Mercury and Ferbam combinations were used.

Apple Scab

Apple scab is one of the most serious diseases of apples. Usually conditions that are favorable for scab infection are unfavorable for applying sprays. Liquid lime sulfur is a satisfactory fungicide for scab control both as an eradicant and protection against infection. Because of the great danger of injury to fruit set, foliage and fruit every effort is being made to eliminate it from the spray program. In getting away from

liquid lime sulfur through the use of Captan and Glyodin the problem of controlling scab has received more attention and as a result the use of mercury compounds has become of increasing importance. This chemical is an outstanding scab eradicant, but has little value as a protective spray. Timing the use of mercury sprays is most important.

A large number of method and result demonstrations were conducted in 1954. Method demonstrations were devoted largely to handling, moving, timing and applying sprays. Result demonstrations were established to test out new spray materials, their concentration, compatibility, effectiveness, and behavior under different conditions.

Results of these demonstrations indicate that mercury compounds may be successfully combined with Captan, Glyodin (Oreg 341), and Ferbas for effective scab control.

The mercury-Glyodin combination gave especially good control of scab.

Fire-blight

New problems are constantly appearing in spite of improvement and changes in spray programs. In 1954 the apple industry experienced a most severe epidemic of fire-blight. While fire-blight is an old disease, it has been more or less taken for granted and no real effort has been made to control the trouble with chemical sprays. However, with the discovery and development of antibiotics, the desire for manufacturers of the chemical to expand their markets and the fact that losses from fire-blight have taken on added importance and new interest in the control of this trouble has been created.

A number of exploratory demonstrations with antibiotics were tried out in 1954. A number of different materials were used, the results secured with two of these materials for the control of fire-blight was remarkable. In each of the five demonstrations conducted with Agrimylin the control was outstanding, ranging anywhere from 85 to 100 percent control. Result demon-

strations with Parfate and Dithone showed no results.

Black Rot

Black Rot of apples is becoming more prevalent each year. There are several factors that appear to contribute for the increase of this disease: First, the dead branches and cankers resulting from fire-blight infections; Second, changes in spray programs, from the use of liquid lime sulfur, half-boiled lime sulfur and Bordeaux mixture. While results with sprays to control Black Rot have not always proved effective, sharp reductions in infection with the above mentioned sprays indicate that the disease was held in check when spray programs included these materials. Because of the serious fruit losses in recent years from Black Rot, the control work for this disease has been stepped up. Result demonstrations were increased in 1954, and have contributed much information.

Combination sprays of Ferban and sulfur; Ferban and mercury were used. Combinations in which Ferban was used gave the best results.

Demonstrations conducted on sanitation and timing of control sprays indicate that these two factors are important for best control of the disease.

Mites

Mite control is a complicated problem: First, because of the appearance of more different types of mites and; second, that at the present time there is not available a miticide that is satisfactory for controlling the different types of mites. With mite control becoming more important since infestations affect yield and quality of fruit the work with mites was increased in 1954.

The work was centered around miticides that have the greatest degree of safety both for operators, tree foliage and fruit. Method and result demonstrations were conducted on a rather large scale using old and new materials in combination with fungicides and other insecticides, together with timing the miticide sprays.

The miticides used were E-P. N - 300; Aramite, Arihotien, Malathion and Systox. The results showed Systox to be effective, but caused injury to foliage and fruit. Aramite proved effective in some plots, but did not give the best control in others. As a whole the best results against all types of mites were secured with Arihotien. Malathion was not satisfactory from the standpoint of mite control.

Codling Moth

Codling moth is still the number one insect problem in growing fruit. The development of D.D.T. has given fruit growers a more effective insecticide for the control of this insect than the old standard arsenate of lead. There has been a feeling that codling moth was becoming resistant to D.D.T. but result demonstrations conducted indicate that in instances of poor control the factors of weather, timing of sprays and thoroughness of application played an important part in unsatisfactory control. Weather conditions in 1952 and 1953, 1954 were favorable for codling moth.

Much extension time is devoted to assisting growers in timing sprays. In 1954 a large number of result demonstrations were carried out in orchards in most of the important fruit growing counties. Result demonstrations were used to test the effectiveness of the three spray programs as given in the 1954 spray bulletin. The program in which lead arsenate was used as the insecticide through the second cover did not give as good a control of codling moth as where D.D.T. alone or D.D.T. in combination with Parathion and E.P.N.- 300 were used. Result demonstrations were also conducted with Black Leaf forty 253 was used. The control in these demonstrations were good with no evidence of injury to fruit and foliage.

Leaf Roller

In 1954 leaf roller was not a serious problem. It is not a difficult insect to control. Little trouble is experienced from leaf roller where sprays

are properly timed. Field meetings and surveys have made it possible to teach growers the habits of the insect and to become familiar with the stages of development for proper timing of the sprays. Four result demonstrations were conducted in 1954. Rothen is an effective insecticide for leaf roller control. It is inexpensive. Good results were secured with Parathion and E.P.N.-300. Malathion at recommended amounts did not give complete control.

Curculio

In recent years curculio have become more prevalent in apple plantings. In some orchards the injury from this insect has been heavy and has made it necessary to give more attention to curculio control. Result demonstration with Dieldrin and Methoxychlor were established in 1954 in six apple plantings. Both materials gave good control. While control costs with Dieldrin are less than with Methoxychlor it should be kept in mind that Dieldrin is not effective against other insects, while Methoxychlor is satisfactory for a wide range of insects.

Curculio is the most important insect of stone fruits. The present spray program for peaches is so effective in controlling peach and other stone fruit insects that only a limited amount of time was devoted to the curculio problem. However, since Parathion requires a great deal of care in using this insecticide and the need for a material that can be used with less danger, a number of result demonstrations with Dieldrin, Malathion and Methoxychlor were established in 1954. Good control of curculio were secured with both Dieldrin and Methoxychlor. Results with Malathion at the two pound dosage were not quite as good as with Dieldrin and Methoxychlor.

Brown Rot

This disease causes annual heavy losses to peach growers. It is especially destructive in the eastern part of the state where humidity and temperatures are more favorable for the development and spread of the disease. Blossoms

Brown Rot is more serious in the eastern peach growing sections. Much time was devoted to Brown Rot control in 1924. Additional demonstrations were established this year. Nygon, Nygon and Sulfur and Captan were used in these demonstrations. Nygon and phytgon and sulfur were effective in controlling Brown Rot in orchards where the disease had become well established. Results with Captan were outstanding. The fruit from the Captan plots had better finish, color and quality. In one orchard sulfur sprayed peaches developed softening and internal breakdown at the pit at harvest time, while fruit from the Captan plot did not show this trouble.

Chemical Thinning

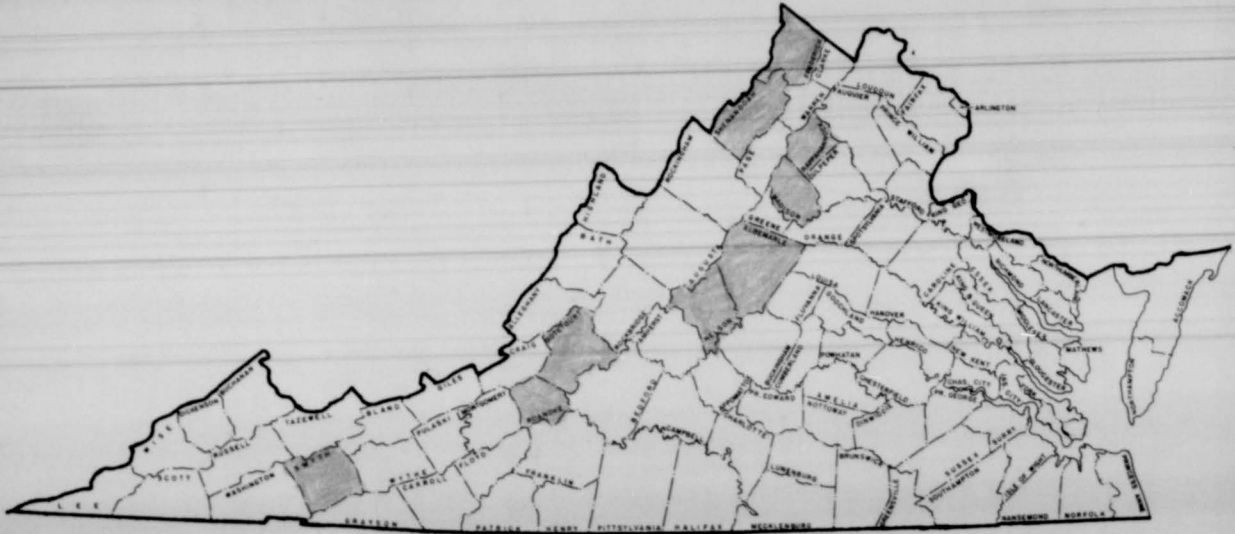
Stabilized production is of prime importance to the fruit industry of the state. The production of a high percent of fruit of good size, high color and high quality is essential to encourage greater consumption and expand markets. To meet these two objectives fruit thinning is of paramount importance.

The old method of hand thinning is too slow and costly to secure the desired results. Thinning with chemical sprays offers the best opportunity to solve the thinning problem. The Extension Staff started work on chemical thinning in 1926. The first materials tested were the dinitro chemicals. From this early work it was indicated that these materials were not suitable under Virginia conditions. Because thinning is so all important in reducing growing costs; to encourage annual yields and improve quality, work on the problem has been continued and expanded.

With the development of kaphthalene acetic acid, first as a preharvest spray to prevent dropping of fruit and later used as a thinning chemical, rapid progress has been made in thinning off fruit early in the season.

Apple varieties differ greatly in their response to the chemical, temperature, time of application, age and vigor of the trees. Much valuable information has been secured from the large number of demonstrations conducted

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Counties in Which Demonstrations With Thinning Sprays Were Conducted

over a period of years. The work with chemical thinning sprays has reached a point where recommendations can now be made for a number of varieties. Further information is needed and with new promising chemicals available the result demonstrations were increased in 1954 with outstanding results.

Stop-drop Sprays

In large crop years such as the industry experienced in 1954 sprays for holding the fruit on the tree until it can be harvested is very important to prevent losses and wastage of fruit. Stop-drop sprays have other advantages, they make it possible to increase size and color which are so necessary in marketing fruit to the best advantage.

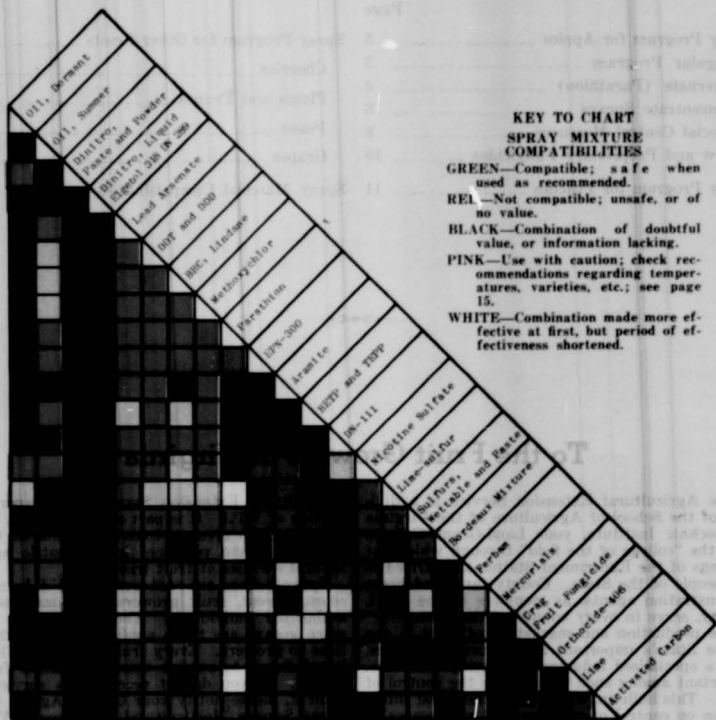
To encourage the extensive use of preharvest sprays much time was devoted to this project in 1954. Both method and result demonstrations were extensively used including work with concentrate sprays and new materials. While Naphtholene acetic acid is satisfactory for preventing drop on most varieties it has certain shortcomings. The most important being that it has a rather short holding period, making it necessary to apply additional sprays. As a result, search has been continued for better chemicals which⁴⁴⁵ been rewarded by the discovery of 245 TF. This chemical will hold the fruit on the trees for as much as six weeks. This makes it necessary to spray only one time. Its development and use has made it possible for the industry to make large savings. The principle drawback to the use of 245 TF is that it has a tendency to hasten maturity of certain varieties.

To secure more information on fruit maturity and on concentrations for the different varieties, many result demonstrations were included in the project in 1954.

Concentrate Sprays

A large number of growers used concentrate sprays in 1954. With new types of concentrate equipment being developed and improvement in the machines

VIRGINIA SPRAY BULLETIN



V.P.I. Agricultural Extension Service

Bulletin 131

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VIRGINIA SPRAY BULLETIN

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To the Fruit Growers of Virginia

The Agricultural Extension Service is a division of the School of Agriculture of the Virginia Polytechnic Institute, your Land-Grant College. It is the "college of the field" through which the findings of the Experiment Station are carried to the people of the State. County farm and home demonstration agents, as members of the V.P.I. faculty, serve in every county of the State.

The production and marketing of fruit is one of the State's important agricultural industries. It is a specialized industry with many problems. Important among such problems is the control of pests. This bulletin, which gives the latest information on control of pests as well as diseases in orchards, is provided annually for you by the

Agricultural Extension Service and Experiment Station of V.P.I. It is part of the Virginia Spray Service which gives up-to-date information on developments and practices in the battle against natural enemies of fruit trees.

Spray notices are sent out from V.P.I. to your county agent, fruit growers' organizations, and authorized individuals. They fill in the dates when sprays are to be applied and mail the notices to growers. Every fruit grower in Virginia is privileged to receive this information free of charge. If you do not receive this service and want it, please notify your County Agent, or the Spray Service, Horticultural Department, Virginia Agricultural Extension Service, Blacksburg.

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Virginia Spray Bulletin — 1952

Information for Virginia Fruit Growers

Prepared by the Departments of Horticulture, Plant Pathology and Entomology, V.P.I.

Spray Program for Apples

REGULAR APPLE SPRAY PROGRAM



These illustrations show, from left to right, male scurfy scale on apple twigs, female scurfy scale, and aphid eggs all of which are controlled by the dormant spray. The picture at far right shows an opening bud on which the aphids have hatched — too late for dinitro chemicals to give best results and for safety from injury to the buds. (The arrow points to an egg of the Syrphid fly, a predator of aphids.)

Control of aphids, curculio, leaf roller, and codling moth, as well as the important apple diseases, through the use of dinitro, lead arsenate, DDT, DDD, and suitable fungicides — this is the aim of the regular apple spray program. Red mite and Japanese beetle are treated as separate problems. An alternate spray program is offered for the best use of parathion. All rates of usage given are for 100 gallons of spray.

Dormant Spray

Apply while trees are fully dormant, before buds show any green. Proper stage is pictured at left.

For Aphids Only: 1½ pounds of a 40% dinitro powder or equivalent in other dinitro formulation.

For Aphids, San Jose, and Forbes Scales: Oil at 2% plus 1 pound of a 40% dinitro powder (or equivalent).

Caution: Do not use DN-289 or Elgetol-318 with oil, or after the buds begin to break.

For Scurfy Scale: Use either superior oil at 3% or regular oil at 4% alone, (will also control San Jose and Forbes scale); or 4 pounds of a 40% dinitro powder alone (will also control aphids.)

Caution: Do not combine oil and dinitro at these strengths. Do not follow dinitro with oil.

Note: Aphids and scurfy scale may be controlled in the petal-fall with parathion. See alternate parathion schedule.

Delayed Dormant

Begin when buds first show green; complete by the time the leaves begin to separate from the buds. Apply only where no dormant spray was applied.



For San Jose Scale, Forbes Scale, European red mite and aphids: Use either superior oil at 2% or regular oil at 3% strength.

For Scurfy Scale, European red mite and aphids: Use either superior oil at 3%, or regular oil at 4%. This spray is recommended only for scale-infested orchards which did not receive a dormant spray.

Note: Where sepal scab has been severe, add either ferbam 2 pounds or bordeaux mixture 2-4-100 to the delayed dormant spray for earlier protection.

Scab & Rust Sprays

Begin spraying in the pre-pink stage or when first color shows in the center buds. Repeat sprays at no longer than 8-day intervals. Continue spraying until center blossoms are open.

For Scab only: Liquid lime-sulfur 6 quarts, or flotation sulfur 12 pounds. Other good paste sulfur may be used at an equivalent rate.

For Rusts and Scab. For rust alone, or where scab is



easily controlled, use 1 pound of a ferbam fungicide. Where better scab protection is needed on rust-susceptible varieties, add $\frac{3}{4}$ pound of a ferbam fungicide to flotation or other paste sulfur as used for scab alone. Where quince rust is a problem, start protection with a ferbam fungicide in the pre-blossom period.



Petal-Fall Spray

Begin spraying for scab and rust 8 days after last blossom application even though petals have not fallen. Add an insecticide only when most of the petals are down.

Fungicide — for Scab and Rust: For scab only, use 12 pounds of flotation sulfur, or

6 pounds of a 70% sulfur paste, or lime-sulfur 6 quarts. For rust and scab control, continue the use of either ferbam or ferbam-sulfur as recommended in the previous spray.

Insecticide— for Curculio, Codling Moth, Caterpillars, and Leaf Roller: Use 3 pounds of lead arsenate, and add 3 pounds of spray lime when used with paste sulfur or ferbam; add 6 pounds of lime when used with lime-sulfur.

First Cover Spray

Begin 8 to 10 days after the petal-fall stage.

Fungicide — for Scab, Rust, and Blotch: For scab only, use 10 pounds of flotation sulfur, or 5 pounds of a 70% sulfur paste. For protection against blotch and continued protection against rust, add 1 pound of a ferbam fungicide to the sulfur, or use $1\frac{1}{2}$ pounds of the ferbam fungicide alone.

Insecticides — for Curculio, Codling Moth, and Leaf Roller: Use lead arsenate at 3 pounds plus either 1 quart of 25% liquid DDD concentrate or $1\frac{1}{2}$ pounds of a 50% dry wettable DDD.

Second Cover Spray

Begin 3 weeks after the petal-fall stage.

Fungicide — for Scab, Rust, Brooks Spot, and Blotch: Use $1\frac{1}{2}$ pounds of a ferbam fungicide for protection against all diseases noted. One pound of a ferbam fungicide may be added to 8 pounds of flotation sulfur or its equivalent in other sulfur for combined fungicidal protection. For scab control only, 10 pounds of flotation sulfur or its equivalent in other paste or dry form may be used if the weather is not abnormally warm or dry. There is danger of sulfur-sun-scald from sulfur applied this late in the season.

Insecticides — for Curculio and Codling Moth: Use 3 pounds of lead arsenate and 2 pounds of 50% or $1\frac{1}{2}$ pounds of 75% dry wettable DDT. Add 3 pounds of spray lime to reduce arsenical injury.

Third Cover Spray

Begin 5 weeks after the petal-fall stage.

Fungicide: A fungicide may be omitted from this application if no scab infection has been per-

mitted to develop. Where continued fungicidal protection is necessary use $1\frac{1}{2}$ pounds of a ferbam fungicide.

Insecticide — for Codling Moth: Use 2 lbs. of a 50% or $1\frac{1}{2}$ pounds of a 75% dry wettable DDT.

Fourth Cover Spray

Begin 7 weeks after petal-fall stage.

Insecticide — for Codling Moth: Use 2 pounds of a 50% or $1\frac{1}{2}$ pounds of a 75% dry wettable DDT.

Fungicide — for Brooks Spot, Bitter Rot, and Sooty Blotch: Use either $1\frac{1}{2}$ pounds of a ferbam fungicide, or Bordeaux mixture 2-4-100.

Fifth Cover Spray

Apply during early or mid-July when the second-brood leaf-roller larvae are active.

Insecticide — for Leaf Roller and Japanese Beetle: Use 1 quart of 25% DDD liquid concentrate, or $1\frac{1}{2}$ pounds of 50% dry wettable DDD.

Fungicide: Not generally required but where protection is deemed advisable on the basis of past experience, use either $1\frac{1}{2}$ pounds of a ferbam fungicide plus a spreader, or Bordeaux mixture 2-4-100.

Sixth Cover Spray

Apply in late July, about two weeks after the fifth cover spray.*

Insecticide — for Codling Moth, Japanese Beetle, and Caterpillars: Use 2 pounds of a 50% or $1\frac{1}{2}$ pounds of a 75% dry wettable DDT.

Fungicide — for Bitter Rot, Black Rot and Sooty Blotch: Use either $1\frac{1}{2}$ pounds of a ferbam fungicide plus a spreader, or Bordeaux mixture 2-4-100.

*1. If you prefer to use lead arsenate throughout the season instead of DDT in the cover sprays add 3 pounds of spray lime per 100 gallons of spray when the lead arsenate is used alone or with a sulfur fungicide — 1 pound when used with the ferbam fungicides. Be prepared to wash the fruit where lead arsenate is used throughout the season.

2. If mites become numerous at any time, use one of the following materials in 100 gallons: 2 pounds of 15% Aramite powder, $\frac{1}{2}$ pound of EPN-300 powder, or 1 pound of 15% parathion powder.

3. To control yellow-necked caterpillars and mites in mid-August, use 1 pound of 15% parathion. Repeat application in 10 days if infestation is severe.

ALTERNATE PROGRAM FOR USE OF PARATHION

Do not follow this program unless you observe strictly the precautions for handling parathion.

Pre-Blossom Sprays

The schedule and materials used prior to the petal-fall spray are the same for the parathion program as in the regular schedule.

Petal-Fall Spray

Begin when most of the petals have fallen.

Insecticide — Aphids, Curculio, Codling Moth, Leaf Roller, and Scurfy Scale: Use 2 pounds of 15% parathion powder.

Fungicide — for Scab and Rusts: For scab only, use either flotation sulfur at 12 pounds or equivalent in other sulfur paste. For rust and scab control, use either ferbam or sulfur-ferbam as recommended in the regular schedule.

First Cover Spray

Eight to ten days after the petal-fall stage.

Insecticide — for Curculio, Codling Moth, and Leaf Roller: Use 2 pounds of a 15% parathion powder.

Fungicide — for Scab, Rust, and Blotch: Use the same fungicide as in the regular schedule.

Second to Sixth Cover Sprays

Same as the regular program except that lead arsenate may be omitted from the second cover where curculio has not been a serious problem.

Precautions on Use of Parathion or EPN-300

If you are unable or unwilling to comply with all of the precautions to provide protection to the spraymen do not use parathion.

Do not apply parathion on any variety of apples within 21 days of harvest.

(1) Avoid breathing in the wettable powder while opening the bags and introducing it into the spray tank.

(2) Avoid inhaling the spray mist or dust during spraying or dusting operations.

(3) While handling or applying the material use a suitable respirator.

(4) Wash hands, arms, and face before eating or smoking.

(5) Wear protective covering when working under conditions of exposure to considerable spray drift or dust.

(6) If clothing becomes wet while spraying, take a bath in soap and water and change clothes immediately. The parts of the respirator touching the skin must be kept clean at all times. If the respirator becomes contaminated, wash with soap and water or get a new one.

(7) Always wear gloves when handling these materials.

(8) Never apply the dust or spray "against the wind" or in such a manner that spraymen may be exposed to the spray or dust drift.

The symptoms of poisoning include headache, blurred vision, weakness, nausea, cramps, diarrhea, and discomfort in the chest. If you feel any of these symptoms while spraying or dusting with parathion or EPN-300, quit work and consult a physician immediately.

CONCENTRATE SPRAYS

Concentrate sprays make it possible to use labor, materials, and equipment more efficiently. Concentrate spray machines are available. They give good results if properly operated.

Suggested Machine Requirements

1. Pump capacity to deliver the needed number of gallons of concentrate spray per tree.
2. Tank capacity of at least 300 gallons.

3. Pump pressure, nozzle size, and arrangement to give fine particle size and with air speed to deliver the spray for thorough and uniform coverage to all parts of the tree — not by drift, but by drive.

4. The air output should be at least 20,000 cubic feet per minute with a drive of at least 90 miles per hour.

Regulating the Gallons per Tree

The number of gallons of concentrate spray to be applied per tree is regulated by the number of nozzles, the size of the nozzle openings, and the speed at which the tractor is driven. Frequent checking up on the speed of the tractor is important in proper coverage. It is more difficult to get good and uniform coverage where the trees are dense and brushy than where they have been properly pruned. Best results are secured when there is little or no wind blowing.

Mixing Materials

Thorough and proper mixing of materials for concentrate sprays is much more important than with dilute sprays. Careless mixing will cause serious clogging of the nozzles, a waste of valuable time, and poor coverage. To avoid trouble, especially when paste, suspended, and hard-to-wet spray materials are used, make them up into thin slurries before pouring them through the strainer.

Advantages of Concentrate Sprays

1. Reduce labor cost.
2. Save material.
3. Make possible more rapid coverage.
4. Make possible better timing of sprays.
5. Give more uniform coverage.
6. Lessen danger of overspraying.
7. Lessen danger of injuring fruit finish.
8. Lessen soil compaction.
9. Lessen soil erosion.

Applying Concentrate Sprays

In applying concentrate sprays, give careful attention to the coverage of all parts of the trees, as well as to the dosage. Check frequently the application of each spray, in order to make sure that all parts of the tree are well covered. From these inspections, you can tell whether nozzle or other changes are needed. Make a count of the number of trees sprayed per tank from time to time to be sure that the proper amount of spray is being put on each tree. Do not drive too fast.

Caution: When Parathion and other similar highly toxic materials are used, all recommended precautions covering the handling of such materials should be strictly observed. Before using Parathion, study safety directions. Consult your doctor about a supply of 1/100 grain atropine tablets for emergency use.

A Suggested Concentrate Spray Calendar for Apples for Concentrate Machines with High Pressure Pumps and Adequate Air Volume and Speed

Quantities for 100 gallons of spray. The 3X concentration is recommended for all sprays except the Pre-Pink, Pink, and Petal-Fall sprays, where the 4X concentration is recommended.

Name and When To Spray	To Control	2X Concentrate	3X Concentrate	4X Concentrate	Caution and Remarks
DORMANT —When buds are completely dormant	Aphids San Jose, Forbes, and West Indian scales	4% superior oil plus 2 lbs. 40% DN powder or 2 quarts regular DN paste	6% superior oil plus 3 lbs. 40% DN powder or 3 quarts regular DN paste	Not advisable in 1952	Do not use DN-289 or Elgetol-318 with oil. Do not apply when trees are wet, or when temperature is below 50°
PRE-PINK —When first pink shows in center buds and before buds separate in the cluster	Scab	12 quarts liquid lime-sulfur, or 24 lbs. flotation sulfur, or 16 lbs. of a 70% sulfur paste	18 quarts liquid lime-sulfur, or 36 lbs. flotation sulfur, or 24 lbs. of a 70% sulfur paste	24 quarts liquid lime-sulfur, or 48 lbs. flotation sulfur, or 32 lbs. of a 70% sulfur paste	BHC is less effective when temperature is below 60°. Do not use liquid lime-sulfur with BHC.
	For aphids where dormant spray was not used add	5 lbs. of 6% gamma BHC to paste sulfur	7½ lbs. of 6% gamma BHC to paste sulfur	10 lbs. of 6% gamma BHC to paste sulfur	
PINK SPRAY —When blossom buds show full pink and have separated in the cluster	Scab only	24 lbs. flotation sulfur, or 16 lbs. of a 70% sulfur paste	36 lbs. flotation sulfur, or 24 lbs. of a 70% sulfur paste	48 lbs. flotation sulfur, or 32 lbs. of a 70% sulfur paste	Safe at high temperatures but may cause injury when humidity is high with temperature above 90°
	Scab, Black Rot and Rusts	30 lbs. flotation sulfur, or 14 lbs. of a 70% sulfur paste plus 1½ lbs. Ferbam	30 lbs. flotation sulfur, or 20 lbs. of a 70% sulfur paste plus 2½ lbs. Ferbam	40 lbs. flotation sulfur, or 28 lbs. of a 70% sulfur paste plus 3 lbs. Ferbam	
BLOOM SPRAY —When 25% of blossoms have opened	Scab Rusts	Same as for pink spray	Same as for pink spray	Same as for pink spray	Apply only when blossoming period is prolonged and there is danger of scab and rusts
PETAL-FALL SPRAY Apply when 75% of the petals have fallen	Curculio Aphids Leaf roller Codling moth Scab Black rot	For scab and insects 24 lbs. flotation sulfur, or 16 lbs. of a 70% sulfur paste plus 6 lbs. of spray lime and 6 lbs. of lead arsenate	For scab and insects 24 lbs. flotation sulfur, or 24 lbs. of a 70% sulfur paste plus 9 lbs. of spray lime and 9 lbs. of lead arsenate	For scab and insects 48 lbs. flotation sulfur, or 32 lbs. of a 70% sulfur paste plus 12 lbs. of spray lime and 12 lbs. of lead arsenate	High humidity and slow drying may cause injury from Parathion at temperature below 65° and injury from sulfur with high humidity at temperature above 90°
	For the pests listed above plus Rusts	30 lbs. flotation sulfur, or 16 lbs. of a 70% sulfur paste plus 1½ lbs. Ferbam and 3 lbs. spray lime and 6 lbs. lead arsenate	30 lbs. flotation sulfur, or 20 lbs. of a 70% sulfur paste plus 2½ lbs. Ferbam and 4½ lbs. spray lime and 9 lbs. lead arsenate	40 lbs. flotation sulfur, or 28 lbs. of a 70% sulfur paste plus 3 lbs. Ferbam and 6 lbs. spray lime and 12 lbs. lead arsenate	
	For mites add	3 lbs. of a 15% Aramite powder, or 1 lb. E.P.N.-300 or 2 lbs. of a 15% Parathion powder	4½ lbs. of a 15% Aramite powder, or 1½ lbs. E.P.N.-300 or 3 lbs. of a 15% Parathion powder	6 lbs. of a 15% Aramite powder, or 2 lbs. E.P.N.-300 or 4 lbs. of a 15% Parathion powder	
FIRST COVER SPRAY —Apply 8 days after petal-fall stage	Curculio Codling moth Scab	20 lbs. flotation sulfur, or 10 lbs. of a dry wettable sulfur plus 4 lbs. spray lime and 6 lbs. lead arsenate	30 lbs. flotation sulfur, or 15 lbs. of a dry wettable sulfur plus 6 lbs. spray lime and 9 lbs. lead arsenate	40 lbs. flotation sulfur, or 20 lbs. of a dry wettable sulfur plus 9 lbs. spray lime and 12 lbs. lead arsenate	Temperature above 85° with humid weather can cause injury

Name and When To Spray	To Control	4X Concentrate	3X Concentrate	4X Concentrate	Caution and Remarks
	For Leaf Roller add	2 quarts of 25% liquid DDD, or 3 lbs. of a 50% dry wettable DDD	2½ quarts of 25% liquid DDD, or 4 lbs. of a 50% dry wettable DDD	3 quarts of 25% liquid DDD, or 5 lbs. of a 50% dry wettable DDD	
	Curdling moth Seab Rust Blotch	16 lbs. flotation sulfur, or 8 lbs. dry wettable sulfur plus 2 lbs. Ferbam and 3 lbs. spray lime and 6 lbs. lead arsenate	24 lbs. flotation sulfur, or 12 lbs. dry wettable sulfur plus 3 lbs. Ferbam and 4½ lbs. spray lime and 9 lbs. lead arsenate	32 lbs. flotation sulfur, or 16 lbs. dry wettable sulfur plus 4 lbs. Ferbam and 6 lbs. spray lime and 12 lbs. lead arsenate	
	For Leaf roller add	3 lbs. of a 50% dry wettable DDD	4½ lbs. of a 50% dry wettable DDD	6 lbs. of a 50% dry wettable DDD	
SECOND COVER SPRAY—18 to 21 days after petal-fall stage	Seab Rust Bitter rot Brooks spot Blotch Coddling moth	16 lbs. flotation sulfur, or 8 lbs. dry wettable sulfur plus 2 lbs. Ferbam and 4 lbs. of a 50% dry wettable DDT, or 2½ lbs. of a 75% dry wettable DDT OR 3 lbs. Ferbam alone plus 4 lbs. 50% dry wettable DDT, or 2½ lbs. 75% dry wettable DDT	24 lbs. flotation sulfur, or 12 lbs. dry wettable sulfur plus 3 lbs. Ferbam and 6 lbs. of a 50% dry wettable DDT, or 4 lbs. of a 75% dry wettable DDT OR 4½ lbs. Ferbam alone plus 6 lbs. 50% dry wettable DDT, or 4½ lbs. 75% dry wettable DDT	32 lbs. flotation sulfur, or 16 lbs. dry wettable sulfur plus 4 lbs. Ferbam and 8 lbs. of a 50% dry wettable DDT, or 5½ lbs. of a 75% dry wettable DDT OR 6 lbs. Ferbam alone plus 8 lbs. 50% dry wettable DDT, or 5½ lbs. 75% dry wettable DDT	Temperature above 90° may cause sulfur injury
	For mites add	3 lbs. 15% Aramite powder, or 1 lb. E.P.N.-300 or 1¾ lbs. 15% Parathion powder	4½ lbs. 15% Aramite powder, or 1½ lbs. E.P.N.-300 or 2½ lbs. 15% Parathion powder	6 lbs. 15% Aramite powder, or 2 lbs. E.P.N.-300 or 3½ lbs. 15% Parathion powder	Slow drying can cause injury from Parathion
THIRD COVER SPRAY—Start 6 weeks after petal-fall stage	Bitter rot Blotch Brooks spot Coddling moth	3 lbs. Ferbam plus 4 lbs. 50% dry wettable DDT, or 2½ lbs. 75% dry wettable DDT	4½ lbs. Ferbam plus 6 lbs. 50% dry wettable DDT, or 4 lbs. 75% dry wettable DDT	6 lbs. Ferbam plus 8 lbs. 50% dry wettable DDT, or 5½ lbs. 75% dry wettable DDT	When possible avoid spraying when temperature is above 90° When Ferbam is used, add spreader to prevent spotting
FOURTH COVER SPRAY—Start 7 weeks after petal-fall stage	Bitter rot Brooks spot Blotch Coddling moth	3 lbs. Ferbam plus 4 lbs. 50% dry wettable DDT, or 2½ lbs. 75% dry wettable DDT	4½ lbs. Ferbam plus 6 lbs. 50% dry wettable DDT, or 4½ lbs. 75% dry wettable DDT	6 lbs. Ferbam plus 8 lbs. 50% dry wettable DDT, or 5½ lbs. 75% dry wettable DDT	When possible avoid spraying when temperature is above 90° When Ferbam is used, add spreader to prevent spotting
	For mites add	3 lbs. 15% Aramite powder, or 1 lb. E.P.N.-300 or 1¾ lbs. 15% Parathion	4½ lbs. 15% Aramite powder, or 1½ lbs. E.P.N.-300 or 2½ lbs. 15% Parathion	6 lbs. 15% Aramite powder, or 2 lbs. E.P.N.-300 or 3½ lbs. 15% Parathion	
FIFTH COVER SPRAY—Early to mid-July for second brood leaf roller	Leaf roller Japanese beetle Diseases, if needed	3 lbs. Ferbam, if needed for diseases plus 3 lbs. 50% dry wettable DDD	4½ lbs. Ferbam, if needed for diseases plus 4½ lbs. 50% dry wettable DDD	6 lbs. Ferbam, if needed for diseases plus 6 lbs. 50% dry wettable DDD	If mites are a problem, use a miticide as suggested in earlier sprays Use spreader if Ferbam is used
SIXTH COVER SPRAY—For late July or early August	Bitter rot Blotch Coddling moth Japanese beetle	3 lbs. Ferbam, or 4-8-100 Bordeaux mixture plus 4 lbs. 50% dry wettable DDT, or 2½ lbs. 75% dry wettable DDT	4½ lbs. Ferbam, or 6-12-100 Bordeaux mixture plus 6 lbs. 50% dry wettable DDT, or 4 lbs. 75% dry wettable DDT	6 lbs. Ferbam, or 8-12-100 Bordeaux mixture plus 8 lbs. 50% dry wettable DDT, or 5½ lbs. 75% dry wettable DDT	Use spreader if Ferbam is used

SPECIAL CONTROL MEASURES

Apple Scab



Scab spots on a leaf and on young apples.

Apple scab is a major disease in Virginia orchards. It thrives in cool, wet weather. It is most serious and destructive during rainy periods from the pre-pink stage until four weeks after the petals have dropped. Apple scab over-winters in the old leaves on the ground. Spores that develop during the winter are ready to be discharged in the spring whenever weather conditions are favorable. Infections occur when rains keep the trees wet for more than 10 hours at 60 degrees. The scab fungus infects the leaves and the stems of the fruit as well as the young and older fruits. To prevent losses from scab, you need to keep the expanding buds, leaves, and young developing fruits covered with a suitable fungicide, more especially during rainy periods.

You can check scab infections with mercury fungicides (Puratized, Tag, etc.) if you use them within three days of the time infection occurs. The older the infection, the harder it is to control. Lime-sulfur is also widely used. Sprays will clear up infections on foliage better than on fruit.

Apple Rusts

Cedar rust is a serious disease in all commercial apple sections of the State. York Imperial, Rome Beauty, and Jonathan seem most likely to get the disease. It affects both fruit and foliage. On the fruit, cedar rust appears as orange or greenish-yellow spots. On the leaves it appears as yellowish spots.

Quince rust has often caused serious losses on apples in Virginia, especially on Delicious, Stayman, Winesap, Rome, and York. Quince rust on the apple fruit appears as more or less sunken or deformed areas, deep green to brown in color. The infection goes deep into the fruit and makes the apple worthless. Quince rust does not affect the apple foliage.

The red cedar is host for both cedar and quince rust. Cedar rust galls or "cedar apples" form during the growing season. During rainy periods the following spring, orange-colored jelly-like masses form and spores are discharged.

Quince rust comes from spores formed on cank-



A cedar gall, which will discharge spores in the spring, is picture top left. The effect of the cedar rust on an apple is shown top right. Quince rust, more damaging than cedar rust, is shown on an apple at lower left. At lower right is shown the canker-like lesions on twigs of a cedar, from which the spores come.

er-like lesions on the twigs and branches of the red cedar.

You can control both cedar and quince rust by (1) destroying the red cedar trees or (2) by spraying with ferbam as outlined in the apple spray program.

Black Rot

Black rot causes losses through both foliage (frog-eye) and fruit infections. Many growers confuse the fruit infection with bitter rot. In the early stage black rot does look somewhat like bitter rot but is easily identified later. Black rot has no concentric rings of spores in the center of the rotted area, as does bitter rot; as the fruit nears maturity, rotting spreads rapidly; and rotted fruits commonly exude droplets of liquid before they dry up.

Frogeye, which is black rot in the early stage on foliage, is seldom troublesome. Ferbam will control it. However, fungicides do not control black rot on fruit any too well. The best measure is to get rid of the source of the trouble which is cankered twigs and small limbs. Broken branches frequently become invaded by black rot. Twigs and branches killed by fire blight almost invariably become infected. Careful pruning is the most effective method of black rot control.

Bitter Rot

Bitter rot is occasionally a serious disease of apples in the commercial apple-growing sections



How a mummified fruit is infecting a new crop of apples with bitter rot is shown in the picture at the left. Early and later stages of infection are shown on the apples at the right. In the later stage (lower right) note the concentric rings and tiny spores.

of Virginia. It is most serious in the eastern and more southern areas. It is most troublesome in warm, moist summers.

Bitter rot begins on the fruit as a small light-brown spot just under the skin. These spots grow very rapidly under favorable warm-weather conditions. Masses of spores are formed in concentric rings on the surface of the spots. Rain washes the spores off onto other fruits and branches below. The rotted fruit hangs on the tree and dries out. It is important to remove all such mummified fruit during the pruning operation, as well as cankered branches and limbs. Bitter rot does not affect the leaves.

Growers should keep a late-season fungicidal cover on susceptible varieties. It will help control bitter rot as well as minor fruit infections.

Brooks Spot

Brooks fruit spot has caused serious losses. Many growers fail to recognize the disease. It has been known for many years, but gave little trouble in Virginia until recently. Infection appears late in the season as small dark green spots on the fruit. There may be many spots, most of them on the calyx end of the fruit. The spots eventually become brown and sunken. You can control brooks spot readily if you apply ferbam or bordeaux mixture during June. Sulfur is ineffective against this disease and most outbreaks are found where sulfur alone has been used in June to control scab.

Brooks spot follows much the same cycle of development as does scab, but comes later. Many varieties are susceptible, but Rome, Stayman, and Grimes are among the most severely affected.



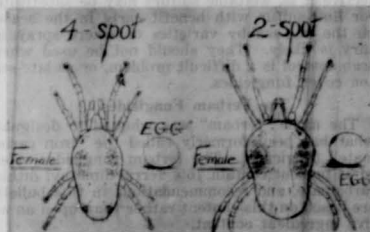
Brooks spot, of little importance until recently, caused serious losses in Virginia the past two seasons. It follows much the same cycle of development as does scab, but is later. The spots eventually become brown and sunken. Sulfur is ineffective against Brooks spot. Ferbam or bordeaux mixture used during June gives control.

Mites



mild spells in winter. During the growing season the red mite may be plentiful at any time, but

Three kinds of mites injure apple leaves: the European red mite, which overwinters in the egg stage on twigs and branches; and two light-green mites, the Schoenei or 4-spotted and the 2-spotted species, both of which overwinter as orange-red females in clusters under loose bark and in cracks. The 2-spotted mite is sometimes active during



the light-green ones are most plentiful from July to September.

To control mites, use one of these materials (quantity for 100 gallons of spray): 2 pounds of 15% Aramite powder, or ½ pound of EPN-300, or 1 pound of 15% parathion powder, or 1¼ pounds of DN-111 powder. DN-111 should not be used when the temperature is above 90° or following sulfur.

Grasshoppers

To control grasshoppers, spray the ground cover with any of these materials (quantity for 100 gallons of spray): chlordane—2 pounds of 50% powder or 2½ pounds of 40% powder; parathion—2 pounds of 15% powder or 1¼ pounds of 25% powder; benzene hexachloride—3 pounds of 6%

gamma powder or 1½ pounds of 12% gamma powder; or 4 pounds of 50% toxaphene powder. Use 100 gallons of spray mixture to the acre if ground cover is not too heavy. Use enough to wet down to the base of growth. A second spray may be needed a week or 10 days later if grasshoppers come in from unsprayed areas.

Japanese Beetle

When Japanese beetles build up in July or early August, use one of these materials (quantity for 100 gallons of spray): 2 pounds 50% DDT powder or 2 pounds of 15% parathion powder. DDD used for leaf roller in early July aids in controlling the Japanese beetle but will not protect the fruit through late July.

NEW AND PROPRIETARY FUNGICIDES

Researchers try out new fungicides every year, but do not make findings public until they have tested the materials quite thoroughly. Several new materials are offered to Virginia fruit growers each year and, in view of this, a brief statement of results to date is given for them. Some are entirely acceptable, and fill a definite place in the Virginia spray program; some have not proved of value; still others are harmful and mention of them is made here to so advise the grower.

Wettable Sulfurs

The term "wettable sulfur" properly refers to sulfur in its elemental form and so treated that it will disperse readily in water. Finely ground sulfur cannot be mixed with water without the aid of some wetting agent. The term "wettable sulfur" is also used to refer to any dry, wettable fungicide which contains sulfur in either an elemental or combined form. The sulfur pastes are also included. They use sulfur in elemental form with water added or remaining from the manufacturing process to give a paste which will mix with water.

Wettable sulfurs are safer to use on fruit and foliage, but not as effective against disease as is liquid lime-sulfur. All wettable sulfur materials are rather mild fungicides, to be used as protective rather than eradicative fungicides. Generally speaking, the finer the sulfur, the more effective it is, wettable sulfurs may be substituted for lime-sulfur with benefit early in the season on the non-scabby varieties or where spray injury is likely. They should not be used where scab control is a difficult problem, or as late-season cover fungicides.

The Ferbam Fungicides

The name "ferbam" was adopted to designate what has been formerly called the "iron carbamate" fungicides. The ferbam fungicides offered at present contain 76% ferric dimethyl dithiocarbamate, and recommendations in this bulletin are based on this content rather than upon an active ingredient content.

The ferbam fungicides were among the earliest organic fungicides tested, and are now widely used. Trade names include Coromate, Fermate, Ferradow, Niagara Carbamate, and Nu Leaf.

Ferbam is most useful in controlling apple rusts. It is only moderately effective against apple scab, and should be combined with a sulfur other than lime-sulfur when used against scab. As a cover fungicide, ferbam protects against blotch, bitter rot, Brooks spot, and sooty blotch. It may not help much, however, if these diseases are severe, particularly at the rates recommended.

Ferbam fungicides are widely compatible with other spray materials. They should not, however, be used with the mercury fungicides, or immediately before or after bordeaux mixture. Lime may be used in limited amount where lead arsenate is used, but too much lime reduces the period of effectiveness of the ferbam materials. Ferbam materials are not safe for use on peaches.

Use a spreader with ferbam fungicides late in the season to prevent spotting of the color and excessive residue. Satisfactory spreaders include Triton B-1956 and Niagara Sprayspread. Since too much spreader will cause excess run-off of the spray, care should be taken to use just the right amount. No more than 1 ounce per 100 gallons is ever required.

The Mercury Fungicides

Organic mercury compounds have been widely tested and promoted as fruit fungicides. They are offered as solutions of approximately 7.5 and 10% active ingredient and as dry powders containing 10% active ingredient. These materials are highly effective against scab under favorable circumstances, but experience with them to date does not justify their universal recommendation.

Mercury fungicides are more useful to eradicate scab than to protect against it. They lose their power quickly. Their effectiveness also may suffer in combinations, and it is better as a rule to use them alone, if possible. **Under no circumstances should they be used following ferbam.**

Mercury materials interfere little with pollination when used in blossom sprays on the apple.

Organic mercury fungicides presently being offered include Puratized Agricultural Spray, Puratized Apple Spray, Dynacide, Coromerc, and TAG Fungicide. They are commonly used at the rate of 1 pint of 5% material per 100 gallons of spray, or the equivalent.

Caution: Mercury concentrates are highly poisonous. Keep the concentrate off the skin and out of the eyes; immediately wash off any that gets on the user. The diluted spray is not caustic and these precautions are not necessary, yet the material should not be treated carelessly. Avoid mercury residues by discontinuing the use of mercury not later than the first cover spray or 10 days after petal-fall. For safety to foliage and fruit, do not use any mercury material when the temperature is above 80°.

Crag Fruit Fungicide 341

Crag Fruit Fungicide 341 is an isopropanol solution of 2-heptadecyl glyoxalidine which must react with lime in the spray tank to form the final free base product. The material has been widely tested and found effective against scab in special situations. It is persistent and leaves a minimum of visible residue. It is not always safe on sensitive varieties, such as Golden Delicious and Jonathan. Crag fruit fungicide has proved most promising as a cover fungicide on the Stayman variety. The material is used at the rate of 2 to 3

pints per 100 gallons of spray, plus 1/2 pound of lime added directly to the spray tank.

Orthocide-406

This product is a relatively new addition to the fungicide field. The active ingredient is N-trichloromethylthio tetrahydrophthalimide. The product as offered is a 50% active-base, dry, wettable material, off-white in color. It has shown considerable promise, having a wide range of fungicidal effectiveness and safety to fruit finish. It has caused some foliage spotting of the Delicious and Winesap varieties under humid conditions. A rate of from 1 1/2 to 2 pounds per 100 gallons of spray is suggested.

Superior Type Oil (High Paraffinic Gil)

The so-called superior type oils result from a high degree of refining. They should meet the following minimum specifications:

Viscosity (Saybolt, at 100°F)	90-120 seconds
Viscosity index (Kinematic)	90 (minimum)
Gravity (A.P.I. degrees)	31 (minimum)
Unsulphated residue (A.S.T.M.)	90 (minimum)
Pour point	30°F (maximum)
Homogeneity — a relatively narrow boiling distillate portion of petroleum	

Oil of this type may be substituted for oil of regular type at somewhat reduced concentrations. For San Jose and Forbes scale, 2% superior oil is roughly equivalent to 3% regular oil. For scurfy scale, 3% superior oil is equivalent to 4% regular oil.

Spray Program for Peaches

Brown Rot & Blossom Blight

Brown rot attacks the fruit, blossoms, and twigs. Where brown rot has been causing blighting and dropping of the blossom and fruit, apply dormant strength lime-sulfur solution just before pink begins to show in the buds. Lime-sulfur at the rate of 6 quarts to each 100 gallons of water may be applied during the pink stage. Wettable sulfurs may be applied at this time, but their value in brown rot control at this stage is doubtful.

If blossom brown rot (blight) has not been present in previous years, follow the regular peach spray program. Brown rot lives over mostly on mummies and dead twigs; therefore, you should remove these from the trees and ground a very important measure in control, one that cannot be overemphasized.

Oriental Fruit Moth

Use DDT to control the oriental fruit moth. For best results make two applications: the first during the shuck-fall stage and the second about 8 weeks before harvest. When parathion is used for plum curculio in the shuck-fall application, DDT need not be used since parathion will also control the oriental fruit moth.

Plum Curculio

The plum curculio is perhaps the most destructive of peach insects. It is at the same time one of the most difficult insects to control. Curculio infested peaches not only displease the consumer, but openings in the skin of the fruit make it easy for brown rot to get started. The control of insects is one of the most important steps in brown rot control. Use parathion and EPN-300 to control curculio. They are much more effective than arsenate of lead and not so injurious to peach foliage.

Black Peach Aphid

Serious infestations of this pest sometimes occur in young orchards.



The oriental fruit moth attacks the tips of tender peach twigs.

This insect is a dark, shiny plant louse that infests both the tops and the roots of the tree. No satisfactory control has been found for the root forms. In the tops it is controlled by spraying the trees with benzene hexachloride at the rate of 2 pounds of 10% or 3 pounds of 6%. Since the aphids are usually found only in spots in the orchard, only those trees need to be sprayed.

Tarnish Plant Bug

This insect causes heavy losses in Virginia peach orchards each year. The scarring of the fruit, commonly known as catfacing, takes place early in the season, and results from healed-over feeding punctures. This insect is a small brownish plant-bug. It feeds on a great number of plants, and becomes active with the first warm spells early in the spring. It is a difficult pest to control. Keeping down weeds and early cultivation helps. DDT is effective and should be used in the petal-fall peach spray.

Peach Tree Borer

Applications of DDT to the trunks of peach trees have proved an excellent control for the peach tree borer. The advantages over other methods are: it is labor-saving and easy to apply, it is safe on all age trees, it kills adult moths and young larvae, no preparation of the trees or soil is necessary, and there is no borer injury during the summer months.

Use DDT (50%) wettable powder 8 pounds in 100 gallons of water. Make two applications: One between July 1 and 15, and a second in August immediately after peach harvest.

A power sprayer may be used for applying the DDT solution by reducing the pressure and using a single nozzle with a straight stream. All sides of the trunk must be sprayed. From 1 to 2 pints of solution should be applied to each tree. Apply to the trunk only, from the ground to two feet above.

Peach Spray Calendar for 1952

NAME AND TIME OF SPRAY	TO CONTROL	MATERIALS FOR 100 GALLONS OF SPRAY
DORMANT	Leaf curl	Lime sulfur, 4 gallons
	Leaf curl, San Jose and Forbes Scales	Lime sulfur, 12 gallons or regular oil 8% (superior oil 2%) plus 2-4-100 Bordeaux
	Leaf curl, San Jose, Forbes and Terrapin scales	Regular oil 4% (superior oil 3%) plus 2-4-100 Bordeaux mixture
PINK BLOSSOM	Brown rot	Lime sulfur (32° Baume) 6 quarts
PETAL-FALL ½ petals off	Tarnished plant bug	DDT (50%) 8 pounds, plus flotation sulfur paste 10 pounds or dry wettable sulfur 5 pounds
	Brown rot	
SHUCK-SPLIT 10 days after petal-fall	Cureulio	Parathion (15%) 1½ pounds, plus flotation sulfur paste 10 pounds or dry wettable sulfur 5 pounds
	Oriental fruit moth	
SHUCK-FALL 7 days after shuck-split	Brown rot	
	Cureulio	Parathion (15%) 1½ pounds, plus flotation sulfur paste 10 pounds or dry wettable sulfur 5 pounds
FIRST COVER 7 days after shuck-fall	Oriental fruit moth	
	Brown rot	Parathion (15%) 1½ pounds, plus flotation sulfur paste 10 pounds or dry wettable sulfur 5 pounds
SECOND COVER About June 10	Scab	
	Brown rot	DDT (50%) 8 pounds, plus flotation sulfur paste 10 pounds or dry wettable sulfur 5 pounds
THIRD COVER About July 1	Oriental fruit moth	
	Brown rot	Parathion (15%) 1½ pounds, plus flotation sulfur paste 10 pounds or dry wettable sulfur 5 pounds
SPECIAL TRUNK SPRAY About July 10	Leaf roller	
SPECIAL TRUNK SPRAY About August 15	Cureulio	DDT (50%) 8 pounds (Apply to tree trunks only)
	Brown rot	DDT (50%) 8 pounds (Apply to tree trunk only)
PRE-HARVEST	Brown rot	Dry wettable sulfur 5 pounds

NOTE: EPN-500 may be substituted for Parathion in the above schedule. Use at the rate of 1 pound per 100 gallons of spray.

Spray Program for Other Fruits

CHERRIES

Scale frequently becomes troublesome on the cherry, often becoming severe before you notice it. When any infestation is apparent, spray.

Cherry leaf spot is the most prevalent cherry disease and the one against which the spray schedule is principally directed. This disease causes partial to complete defoliation of unsprayed or improperly sprayed trees. Many of the insoluble copper materials have proved effective against the disease, and many growers use these products exclusively. Bordeaux mixture is also very efficient, but causes a slight dwarfing of the fruit and consequent reduction in yield. Lime-sulfur is also widely used but is not always too effective against leaf spot, particularly late in the season. Lime-sulfur also has a tendency to cause a scalding of fruits that are held some time after picking, a condition objectionable to the canner. The wettable sulfurs have not been very effective against leaf spot but are sometimes used as a pre-harvest brown rot spray where the picking season is prolonged.

Wormy cherries may occur where curculio and the cherry fruit fly are present. You can usually control insects by adding lead arsenate, 2 pounds to 100 gallons, in the second and third sprays (shuck and first cover).

The black cherry aphid frequently becomes a problem on cherries. You can control this insect by using parathion at the rate of $\frac{3}{4}$ pound of 15% wettable powder per 100 gallons of spray applied when aphids are present.

Caution: See precautions for handling parathion on page 5. If this aphid has been troublesome in the past, dinitro at the rate of $1\frac{1}{2}$ pounds of 40% powder or equivalent in other formulations may be used in the dormant period against the egg stage. Dormant oil must not be used following dinitro at this rate in less than three weeks without probability of serious injury. However, dormant strength lime-sulfur may be used only a few days after a dinitro application.

NO.	WHEN TO APPLY	TO CONTROL	MATERIAL FOR 100 GALLONS
1	Dormant season	Scale	Lime-sulfur, 32 ¹ Baume, 14 gallons or 3% oil
2	Immediately after petals fall	Leaf spot Curculio Brown rot	Lime-sulfur, 32 ¹ Baume; On <i>Sour Cherry</i> , 8 quarts; on <i>Sweet Cherry</i> , 6 quarts. Add 2 pounds lead arsenate and 3 pounds lime to each 100 gallons of solution
3	One week after petal-fall or when $\frac{2}{3}$ of shucks have fallen	Leaf spot Curculio Brown rot	Same as No. 2
4	First cover; two weeks after No. 3	Leaf spot Curculio Fruit fly Brown rot	Same as No. 2, or an insoluble copper 2 pounds plus lime 3 pounds with lead arsenate
5	Second cover; two to three weeks after No. 4 when fruit is coloring	Leaf spot Brown rot	An insoluble copper 2 pounds plus lime 3 pounds, or Bordeaux mixture 11-5-3-100
6	Immediately after fruit is harvested	Leaf spot	Same as No. 3

PLUMS AND PRUNES

The dormant spray on plum is directed principally against scale and, in some instances, against red mite. The plum tree, like all fruit trees, is attacked by scale insects. The principal pests affecting the plum are curculio and brown rot, and to no small degree the problem is one. Curculio punctures frequently carry the brown rot fungus into the fruit, infecting it beyond hope of control with any spray. Plum varieties vary

in their susceptibility to brown rot and this fact will influence any plum spray schedule. Where this disease has gained a foothold or given trouble, it is hard to control because sprays don't stick very well on the waxy surface of the fruit. An effective spreader is at times essential in obtaining satisfactory covering. The sanitary practices recommended for peaches are also applicable to the plum.

NO.	WHEN TO APPLY	TO CONTROL	MATERIALS FOR 100 GALLONS
1	When buds are dormant	Scale Red mite	Superior oil Emulsion 3%
2	SHUCK SPRAY—When shucks are dropping	Curculio Caterpillars Leaf spot Brown rot	10 lbs. flotation sulfur plus 3 lbs. spray lime and 3 lbs. lead arsenate
3	FIRST COVER SPRAY—One week after shuck spray	Curculio	3 lbs. spray lime and 3 lbs. lead arsenate or 2 lbs. of 15% Parathion or 1½ lbs. E.P.N.-300
4	SECOND COVER SPRAY—One week after first cover	Curculio Leaf spot Brown rot	10 lbs. flotation sulfur or 5 lbs. dry wettable sulfur plus 3 lbs. spray lime and 3 lbs. lead arsenate or E.P.N.-300 or 15% Parathion as in spray No. 3
5	THIRD COVER SPRAY—One week after second cover	Brown rot Leaf spot	Same as for second cover spray
6	FOURTH COVER SPRAY—One month before harvest	Brown rot	5 lbs. dry wettable sulfur
7	FIFTH COVER SPRAY—One week before harvest	Brown rot	5 lbs. dry wettable sulfur

PEARS

The pear spray program is directed principally against scale and psylla in the dormant, and against codling moth, scab, and leaf blight in the later sprays. No spray has proved effective against fire blight. Thus the sprays recommended are not to be considered for this disease. Codling moth, or the common apple worm, is frequently

troublesome on the pear. The lead arsenate included in the schedule is for the control of this insect.

The spraying of pears is not widely practiced in Virginia for various reasons, the principal one being that fire blight has largely eliminated all but the Kieffer variety, a disease-resistant pear.

NO.	WHEN TO APPLY	TO CONTROL	MATERIAL FOR 100 GALLONS
1	Dormant or delayed dormant	Psylla, and scale insects	Oil emulsion 3%, or lime-sulfur 14 gallons
2	Pink—apply when the buds have separated in the cluster, but before the blossoms have opened	Fear scab, curculio and leaf blight	Bordeaux 4-8-100 and lead arsenate 3 pounds
3	Petal-fall—apply immediately after petals fall	Scab, curculio, leaf blight, and codling moth	Bordeaux 2-4-100 and lead arsenate 3 pounds
4	17 days after petals fall	Scab, curculio, leaf blight, and codling moth	Same as No. 3
5	5 weeks after petals fall (For winter varieties only)	Codling moth	Same as No. 3

GRAPES

Black rot is the most serious disease of grapes in Virginia. It is caused by a fungus and the infection takes place early in the season. To control this disease spray early and stick strictly to this schedule. The first four sprays are the most important.

The fungus is carried over on the infected canes, old leaves and mummied grapes. After pruning, rake up and burn all of the mummied fruits, old leaves, and trimmings. Spray the vines thoroughly with a dormant spray.

NO.	WHEN TO APPLY	TO CONTROL	MATERIAL FOR 100 GALLONS
1	Dormant season	Scale and general clean-up	Lime-sulfur 12 gallons
2	When second or third leaf shows	Anthraco-sis, bitter rot, black rot, and mildew	2 pounds Ferbam or Bordeaux 4-6-100, and 2 pounds soybean flour or other good sticker-spreader (1)
3	Immediately before blossoms open	Diseases, leafhopper, rose bug, and berry moth	Same as No. 2, plus 2 pounds 50% wettable DDT powder or 3 pounds lead arsenate
4	Immediately after blossoms fall	Same as No. 3	Same as No. 3
5	Just before berries touch in cluster	Same as No. 3	Same as No. 3
6	Where black rot has been unusually severe, it is suggested that 4-6-100 Bordeaux be applied at two-week intervals after No. 5 until three weeks before harvest.		

(1) Skim-milk may be substituted for soybean flour and used at the rate of 2 gallons for each 100 gallons of Bordeaux mixture. To remove Bordeaux spray residue, wash grapes in a 1% hydrochloric or acetic acid solution. For home use, dip grapes in a solution of 1 part vinegar to 5 parts of water; then rinse in clear water.

Spray Material Compatibilities

A lot of new materials for killing pests are on the market. This is why it is so important for you to choose the right mixtures for your sprays. The wrong prescription may prove costly to you. Our experience with some of the newer products is naturally somewhat limited. However, many tests are under way to find out what materials go with what in sprays, and much has already been learned. The important points are summarized below.

Dormant oils.—Generally compatible with materials that you used in the dormant season. The exception is that lime-sulfur or bordeaux mixture will break the soap-type emulsions. Dormant oil applications cannot safely follow dinitro sprays by less than two weeks.

Dinitro materials.—Compatible with dormant oils and safe if you take proper precautions regarding dosage and condition of buds. Not compatible with lime-sulfur. The amine dinitro salts (DN-289 and Elgetol-318) are unsafe with oil.

Lead arsenate.—Compatible with sulfur and copper fungicides except that liquid lime-sulfur makes arsenicals less effective.

Benzene hexachloride.—Not compatible with lime-sulfur, bordeaux mixture, or any mixture containing lime. Compatibility with arsenicals doubtful.

DDT.—Compatible with most materials but effectiveness and persistence is reduced by lime and alkaline materials. Poorly compatible with lime-sulfur.

DDD.—Compatibilities essentially the same as for DDT for the dry wettable form. The solvent used in the liquid form may prove injurious with DN-111 and lime-sulfur.

Methoxychlor.—Compatibilities essentially the same as for DDT and DDD.

Parathion.—Not compatible with lime; prefer-

able to avoid its use with lime-sulfur or bordeaux mixture.

Hexaethyl tetraphosphate and tetraethyl pyrophosphate.—Not compatible with lime, alkaline sprays, or copper fungicides. They reduce effectiveness of the mercury fungicides. Should not be applied to visible copper residues.

DN-111.—Not compatible with lime, lime-sulfur, bordeaux mixture, alkaline mixtures, or summer oil. Should not be applied to fresh lime-containing residues for maximum effectiveness.

Lime-sulfur.—Satisfactorily compatible with very few materials although it has been commonly used with the arsenicals, lime being used as a buffer. Reduces the effectiveness of the arsenicals and DDT. Most satisfactory when used alone or with lime.

Flotation and wettable sulfurs.—Compatible with most products other than oils or dinitro materials; however, since it is desirable to use lime with the sulfurs and since lime reduces the effectiveness of organic insecticides, the use of ferbam is preferable.

Crag Fruit Fungicide.—Compatible with sulfurs, ferbam, lime and DN-111. Not satisfactorily safe with lead arsenate or BHC.

Ferbam.—Widely compatible except with bordeaux mixture and other copper fungicides and the mercury fungicides. Severe foliage injuries have resulted from the application of mercury fungicides to ferbam residues. Preferably used without lime.

Mercury fungicides.—These materials are most effective when you use them alone. Their fungicidal effectiveness is reduced by most materials, and completely nullified by a few. Do not use with or following the ferbam fungicides. May be used with DDT satisfactorily. Lead arsenate and sulfur reduce effectiveness. May cause foliage

injury when combined with the organic phosphates (parathion, EPN-300, Metacide).

Orthocide-406.—The only apparently serious incompatibility with this material which has developed to date is the combination with both activated carbon and parathion. Experience with it has been limited, however.

Bordeaux mixture.—Incompatible with HETP and TEPP, summer dinitro compounds, and benzene hexachloride. Compatibility is uncertain or unsatisfactory with most of the organic insecticides and fungicides. Used satisfactorily with

DDT. An excellent corrective for use with the arsenicals.

Lime.—Long used as a corrective with sulfur, copper, and arsenical sprays, lime has little use with the newer organic pesticides. It is incompatible with most of them and necessary only with Crag fruit fungicide.

Zinc sulfate-lime.—Compatible with the wettable sulfurs and an excellent corrective for the arsenicals. Zinc sulfate-lime is not compatible with benzene hexachloride or most of the other organic insecticides.

Spray Material Compatibilities

A lot of new materials for killing pests are on the market. This is why it is so important for you to know the right mixture for your spray.

The wrong combination may prove costly to you. Our experience with some of the newer products is naturally somewhat limited. However, many tests we have run to find out what materials go well with what in sprays, and much has already been learned. The important points are summarized below.

Downy mildew.—Generally compatible with most materials. Incompatibility with lime is not a problem that you need to be concerned about. The exception is that lime-sulfur or Bordeaux mixture will break the sooty-blotchy mildew. In most of applications caused early in the season, spray of one of the two cures.

White rust.—Compatible with downy mildew and Bordeaux mixture. Incompatibility with lime is not a problem that you need to be concerned about. The exception is that lime-sulfur or Bordeaux mixture will break the sooty-blotchy mildew. In most of applications caused early in the season, spray of one of the two cures.

Leaf and stem blight.—Compatible with sulfur and copper fungicides except that liquid lime-sulfur may be objectionable. Bordeaux mixture is also effective. Bordeaux mixture is also effective. Bordeaux mixture is also effective.

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that have been available, considerable time was devoted to concentrate spraying. Spraying with concentrates makes it possible to affect tremendous savings in spraying costs. It requires only one man to operate and apply sprays with a concentrate machine, while with the conventional portable equipment it took anywhere from three to six men. Time of spraying is reduced by one-half to two-thirds. There is less danger of spray injury with concentrates since coverage is more uniform and over spraying is almost entirely eliminated. Result demonstrations indicate additional savings, especially on materials. When concentrates were first used, concentrations of 6x, 8x and 10x were recommended.

Results from demonstrations have made it possible to reduce the concentrations to as low as 2 1/2x without endangering control.

SPRAYING ACCOMPLISHMENTS

Spray bulletin prepared	1
Copies of bulletin distributed	8,500
Spray notices prepared	20
Insect and disease surveys	12
Conferences in planning and timing sprays	27
Orchard visits on spraying problems	86
Method demonstrations in mixing, handling, applying the sprays	22
Result demonstrations on scab and rusts	19
New materials tested	12
Result demonstrations on mite control	15
Method demonstrations with thinning sprays	8
Result demonstrations plots with thinning sprays	16
Method demonstrations in applying harvest sprays	8
Result demonstrations with preharvest sprays	20
Result demonstrations with concentrate sprays	14

Result demonstrations on fire-blight control	9
Result demonstrations on curculio control	6
Result demonstrations on control of Downy mildew	3
Result demonstrations on Brown Rot Control	12
Fruit schools on spraying	11
Meetings at which spraying was discussed	32
Field Meetings	6
Tours	3

PRUNING PROJECT

There was a time when pruning was of little concern to fruit growers of the state. Export markets were a ready outlet for small and even poor colored apples. Today with little export demand, keen competition, consumer preference, self-service food stores and modern merchandising methods, there is little place for small and inferior fruit. The demand is for fruit of excellent quality, good appearance, large size and high color. Experienced orchard labor is scarce. Wages are the highest in history. Spray materials are expensive and it costs just as much to store a bushel of small apples as it does to store a bushel of big apples.

Proper pruning is the answer to many grower problems that have to do with better annual yields, large size, good appearance, high color and reducing costs. Pruning can prevent wasting money on spraying unprofitable wood. It can improve annual yields. Since light is one of the most important factors in producing fruit of good color, pruning offers the only solution to opening up the trees to better distribution of light.

With greater improvement and development of automatic spraying equipment proper pruning is more essential than ever in order to get through

spray coverage in all parts of the tree. Vigorous fruiting wood is necessary if trees are to produce regular crops. Not only is vigorous wood need to grow good fruit annually, but the wood must be well distributed over the entire bearing surface. Proper pruning reduces thinning costs. In the light of these many factors the first consideration was given to developing a method of pruning that would best meet the new conditions. In order to reduce pruning costs stress has been put on the use of power pruning. Records from recent demonstrations show that mechanized pruning reduces pruning time by fifty percent at a great saving to the industry. There has been a rapid increase in the use of power pruning equipment with more than 100 outfits in operation in 1954.

The use of platforms is expanding rapidly. The job of pruning is not completed until the brush has been taken out of the orchard and disposed of by burning or otherwise. Picking up the prunings by hand was a tedious and time consuming job. With present brush removal methods the task is one of pleasure when compared with the old methods. The changes have been revolutionary. Starting with brush burning sleds in the early thirties, by which it was no longer necessary to haul the pruning out of the orchard. However, it was still necessary to handle every piece of brush by hand. In the middle thirties the first demonstration in handling brush mechanically was conducted in Nelson County using a home made bush rake. Growers were slow in adopting this method of brush removal in spite of the fact that it took a lot of the hard work out of the job, besides cutting down on the time required to dispose of brush in the manner. Then came World War II with labor hard to get and wages high, growers were almost forced to use new ways of conserving labor and reduce costs, since that time rapid progress has been made in developing and improving brush removing equipment. Today the old hand method has gone out of existence. With present day hydraulic lifts, mechanized bush rakes,

an pushers, the job of disposing of prunings is an operation requiring very little time, comparatively speaking, at little cost. Today one man will pickup and remove the pruning from ten acres in less than a day.

While brush removal is a mechanized operation, the fact remains that the brush still has to be handled and taken out of the orchard. Rapid progress has been made in developing equipment that will remove this objectional feature of the pruning problems. In 1931 Mr. Fred Bartenstine, a mechanically minded grower in Fauquier, made a home made brush cutter. A piece of equipment that cut up the pruning into short pieces and leaving the shredded brush in the orchard. This equipment made it possible to dispose of the prunings with any hand labor and at the same time gave shallow cultivation. Growers did not think much of the idea and received little attention until in the middle forties when the new tillage tool known as the culticutter was developed. Its primary purpose was to work up the soil with a lifting action but without turning the soil as to encourage erosion. In using this equipment growers observed that pruning that had been left in the orchard were cut into pieces and pressed into the soil. With this experience the culticutter came into use as a brush cutter. Today progress has been made in this direction to the extent that brush shredders are now available and are coming into more general use.

PRUNING ACCOMPLISHMENTS

Method demonstrations in pruning young fruit trees	46
Result " " " " " "	23
Method " " " bearing " "	65
" " " power pruning " "	21
" " " " " bearing fruit trees	16
Method " " use of platforms	4
Meetings at which pruning was discussed	32

Brush removal demonstrations	5
Demonstrations with brush shredders	12

RODENT CONTROL

Rodents and more particular pine mice are one of the apple industry's most serious problem. The destruction caused by these animals runs into many thousands of dollars each year. In 1954 the losses caused by mice were exceptionally high in spite of the extension efforts to assist growers in controlling them. Every tree destroyed by mice means reduced yields. Every damaged tree means more low grade fruit. In years of prolonged dry weather succulent food becomes more scarce and then fruit trees become especially susceptible to damage from mice.

While satisfactory control can be had with the poison bait method, if properly carried out, many growers do not appreciate the importance of care and thoroughness in preparing and distributing poisoned baits. There is need for a more fool proof economical and practical method. The research work being conducted by Dr. Horsfall with poison ground sprays appears to hold much promise. This research work and the results from limited demonstrations with ground sprays indicate that this method holds the answer to the rodent problem.

RODENT CONTROL ACCOMPLISHMENTS

Circular letters prepared	1
Visits to orchards on rodent control	69
Method demonstrations in preparing baits	7
Demonstrations in distributing baits	32
Demonstrations in ground spraying	4
Meetings at which rodent control was discussed	22
Fruit schools at which rodent control was discussed	8

THINNING

Earlier in this report thinning apples with chemical sprays was discussed briefly. In 1954 more time was devoted to this project than in the previous three years, because of heavier fruit sets. While hand thinning is slow and costly most growers still used this method, especially on peaches.

THINNING ACCOMPLISHMENTS

Meetings at which thinning was discussed	26
Hose method demonstrations with peaches	17
Hand method demonstrations with peaches and apples	30
Result demonstration in thinning peaches with sprays	4

ORCHARD MANAGEMENT

Fruit trees suffered seriously from the prolonged dry weather in 1953. Trees went into the winter, generally, in a more weakened condition. Conditions in 1953 were favorable for fruit bud formation, and it was felt by the extension staff in fruit growing, that if the trees were to set a good crop, it would be necessary to overcome the weakened condition resulting from the drought as quickly as possible. With this in mind a new look was taken in cultural practices. The program consisted of more winter cultivation to break up the sod and other cover so that moisture would penetrate more rapidly into the deeper parts of the root zone. Efforts were also taken to make more moisture and plant food available to the trees, especially in the early part of the growing season. Another factor, was to use larger amounts of nitrogen fertilizer and apply the nitrogen earlier in the season. Efforts were taken to keep down cover crop growth by more frequent mowing and greater use of the culticutter.

Additional result demonstrations in fertilizer and cover crop management were established in 1954.



: A NEW "SQUEEZE" TYPE :
: LIFT TRUCK IS EMPLOYED :
: IN VIRGINIA :



: THE "SQUEEZE" TYPE LIFT TRUCK SAVES :
: LABOR AND PREVENTS MUCH BRUISING :

With greater interest in new plantings there is need for further information regarding the effects of different cultural treatments on fruit size, condition and finish. Much trouble is experienced with some varieties in the development of the trouble known as bitter-pit and related troubles, which are thought to be associated with temperatures and soil moisture relationship.

Another problem that is attracting greater grower interest is that of Woolly Aphis infestations. Result demonstrations were established in 1954 in order to secure information on this problem. There are three main reasons for devoting a large amount of time to this project: One, lowering production costs by maintaining high annual yields; two, producing a high proportion of large sized fruit and; three, to improve aeration of the soil and to conserve soil and regulate moisture.

Results from demonstrations show that tree performance can be improved by the use of certain orchard management practices.

The trend in peach growing is toward a semi-sod system of culture. In the past the clean cultivator method was used almost exclusively in growing peaches by such a practice encourages erosion and soil washing. Result demonstrations indicate that a semi-sod system of culture is well suited to peach production with less cost. While tree growth under this system is not as vigorous, the fruit is just as large, if not larger, but the fruit is of higher color and quality and carries better into the market.

Extreme dry weather during recent years has created a great deal of interest in irrigation. In 1954 additional systems were installed and considerable time was devoted to this work in assisting growers to time applications of water, amounts to apply at one time and in observing results.

ORCHARD MANAGEMENT ACCOMPLISHMENTS

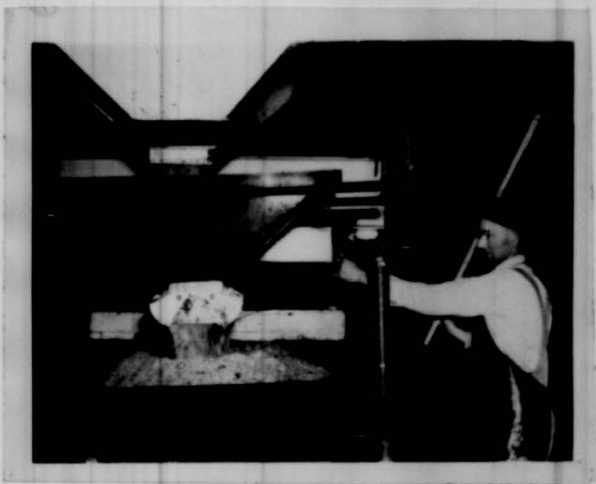
Counties in which result demonstrations were conducted	26
Orchard surveys and programs prepared	43
Orchard visits to assist growers with cultural problems	96
Twilight meetings	9
Culticutter result demonstrations	20
Rotatiller result demonstrations on cultivation of young trees	6
Growers assisted with irrigation problems	6
Method demonstrations in cultivation	15
Number of irrigation systems in operation	20

HARVESTING AND MARKETING

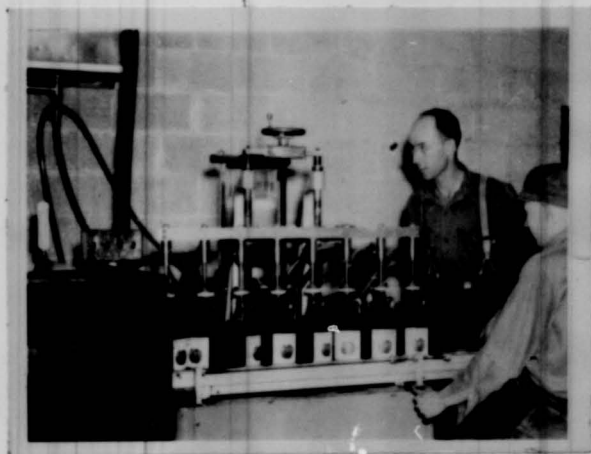
In years of large crops it is necessary to devote a large amount of time to this work. It is difficult to expand markets rapidly when supplies are short one year and large in another. It means also that in years of large production better quality and condition of fruit becomes increasingly important. Great care is needed in harvesting and handling the fruit through the packing house and into storage, if good keeping quality is to be assured.

Early in the year when it becomes evident that production would reach a high level, a plan was put into operation, which would, first of all inform the growers as to the problems that could be expected to develop in moving the larger volumes of fruit. Second, surveys were made from time to time on crop development, what could be expected as to size, color and quality. Third, surveys were made on proper time of harvesting, and fourth on the use of containers that would aid in moving the crop to the best advantage and fifth, on what growers could expect in the way of processor demand.

The problem was complicated by wide spread hail damage. Here again, efforts were made to get growers to thin the fruit where hail damage was



: CHOPPED APPLES ARE PREPARED FOR PRESSING :



: MARKETING OF FRESH APPLES IS IMPROVED AS FRUIT GROWER :
: BOTTLES CIDER FROM A LARGE VOLUME OF OFF-GRADE APPLES :

serious, in order to improve the quality of the fruit at harvest time.

Much was accomplished by these efforts.

In 1954 a series of harvesting and handling schools were conducted just before and at the beginning of the picking season. Careful handling in the process of picking, grading, and packing were stressed through the use of discussions, demonstrations and movies.

Growers were informed on probable processor demand, and how the processor outlet could be used to the best advantage. It was evident that the fresh fruit pack would be large and that with heavier storage holdings in prospect, a storage survey was made to determine how much storage space would be available. This survey indicated that storage space was not sufficient to meet the demand of growers for space.

Meetings were held to inform growers on package trends, probable demand for different varieties and the period which would be most advantageous to move the different varieties. Stress was placed on heavy movement into the markets during the harvesting season.

A large number of visits were made to determine maturity.

Hurricane Hazel

The high winds from this disturbance added serious difficulties to the industry. Coming at a time when there still remained a large part of the crop on the trees made matters even worse. The heaviest damage occurred in the Piedmont Area where eighty percent of the fruit that had not been harvested was blown from the trees. The fruit was badly bruised. Emergency meetings were held in an effort to work out a program that would help reduce loss. By press and radio the situation was broadcast to the trucking trade urging them to assist in moving the fruit at salvage prices. Much fruit was moved, but it was impossible to locate outlets for such a large volume of fruit in the short period of time and as a result a large volume of this fruit was moved into storage.

Many hundreds of trees were blown literally out of the ground with hundreds so badly twisted that it did not seem advisable to attempt to try to straighten them up. A number of demonstrations were conducted in treating and caring for these trees. A large number of visits were made to advise growers as to what to do.

Harvesting and Marketing Accomplishments

Crop outlook meetings	22
Harvesting schools	12
Meetings at which harvesting, packing & grades were discussed	29
Conferences on grades	15
Crop surveys	12
Orchard visits on harvesting	36
Packing house visits	23
Cold storage surveys	11
Cold storage visits	30
Field meetings on harvesting	4
Number of consumer packaging installed	14
Grading demonstrations of "Hazel" fruit	3
Emergency meetings on program for marketing hurricane fruit	4

The Fruit Outlook for 1955

Total production of fruit in the United States for 1955 is expected to be somewhat larger than in 1954, if the weather is favorable.

Citrus Fruit- offers strong competition for apples with indications that total citrus production will be larger in 1955, the need for quality apple production becomes apparent.

Pears - It is indicated that pear production in 1955 will show an increase over 1954. The mid west is expected to have a larger crop of pears and with the

progress that has been made in handling pears they will offer greater competition for apples. Another favorable feature for pears is the fact that larger exports are anticipated.

Plums - Plum production in 1954 for all the leading prune and plum producing states was below average. The outlook is for a much larger crop in 1955.

Peaches - Peach production for the country has declined (as a whole) sharply during the past war period. High tree mortality from low temperatures during the late forties and early fifties has caused the peach tree population to go down sharply. It is not expected that peach production will approach the record crops of the early forties for some time. In recent years peach plantings have been increased in most of the southern commercial producing states. The new plantings are for the most part of early varieties.

Apples - The production of apples in 1954 was considerably larger than in 1953 but was still below the ten year average. The 1954 crops of a little over 103 million bushels as compared to around 93 million bushels in 1953 showed a definite increase though. The far western states had smaller crops in 1954 and this is also true for the midwestern producing states. Most of the increased production in 1954 was in the east. The greatest increase was in the Appalachian Belt. The outlook for 1955 is for a production about the same as in 1954. If the weather is favorable in the far west and mid western states, the production in 1955 is expected to be considerably larger than in 1954. The production is expected to be smaller in the Appalachian Belt and in the more southern states of North Carolina and Tennessee.

Crop Prospects in Virginia

Peaches - In recent years peach tree removal in the state has been heavy. There have been very few new plantings made in the state since 1950. In 1954 interest in plantings increased and a considerable number of trees were planted. The trend in the new plantings is to the earlier varieties.

Late spring frosts cause serious damage in the Crozet section, which is one of the largest peach producing areas in the state. This of course affected the 1954 production. It will be some time before peach production in the state reaches anywhere near the large crops of the early forties. With favorable weather and barring damage from spring freezes a crop of one and one-half million bushels is indicated for 1955.

Apples - Production of apples in Virginia was the largest since 1950. A large amount of fruit was wasted due to Hurricane Hazel, plus early freezing temperatures that found much fruit still on the trees. If wastage is taken into consideration, the 1954 will be between 12 and 13 million bushels. The production was especially large in the northern part of the state. Moisture was plentiful and the size of the fruit was above average. The outlook for 1955 is for a much smaller crop of apples. In the northern valley production is expected to be sharply reduced. This area is heavy to Yorks, which is an alternate bearing variety. It was the on-year for this variety in 1955. Prospects are for a smaller crop of Red Delicious, Romeas and Golden Delicious. With lighter production of these varieties in prospect the production in 1955 is expected to be between eight and nine million bushels.

Production Costs in 1955

On a unit basis it is indicated that production costs will be about as high in 1955 as they were in 1954. Prices of some spray materials will be lower in 1955, but with a shorter crop the unit cost will remain about the same.

Demand Outlook

Apples - With high consumer income indicated for 1955 apple production should be in a favorable demand situation. Especially with a shorter crop in prospect for 1955 in the Appalachian area and in the state this should be true.

The processor demand is not expected to be as favorable as for the early part of the 1954 season. Processor carry over is expected to be larger due to the larger

peak from the 1954 production. Export demand looks more favorable, so considering all factors the demand should be good for the 1955 crop.

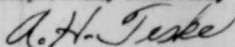
Peaches - Virginia produced a little over 1,200,000 bushels in 1954 as compared to 1,240,000 bushels in 1953. There was a good demand for the 1954 production. Extremely dry weather cut the size materially. The crop matured about one week earlier than normal and while there was a rather large volume of fruit still moving from the Carolina's. The peak of canned peaches from the 1954 crop was below the peak of 1953 and it is expected that demand for the 1955 crop will be better than in 1954. Another factor that should improve demand is the fact that more home freezers will be in operation.

Price Outlook for 1955

Great progress is being made in the harvesting and handling of this fruit. Growers are becoming more conscious of consumers resistance to green peaches and with hydrocooling, peaches are being picked at a more mature stage. This together with a better spread in the movement because of the trend to earlier varieties should make for a more favorable price situation. Prices in 1955 should be as good or better than in 1954.

Apples - With large production in the state in the whole Appalachian Area, coupled with hail and wind damage to the crop, growers are experiencing considerable difficulty in maintaining prices. With processors unable to handle the increased supplies it was necessary to pack and store a much larger volume. Prices for the 1954 crop will average considerably below the prices of 1953. However, with a shorter crop in prospect in 1955, prices to growers should be better than in 1954 and be well in line with returns in 1953.

Respectfully submitted,



A. H. Teske
Extension Horticulturist

SMALL FRUITS, NUTS AND OTHER CROPS

This section of the 1954 Pomology Annual Report is based primarily centered about the servicing and promotion of the state's small fruit industry. In as much as I was requested to develop a separate report it will be necessary to include other crop activities which called for a real share of my field activity time. This was often true in working with county agent personnel and inevitably we were confronted with information needs having to do with tree fruits (accounting for approximately one-fifth of my field time) nuts, specially fruit crops such as figs, damsons, cherries and dwarf fruit. There were also numerous instances when it was logical to assist with the vegetable information needs. Thus it is, that the reader should relatively understand why it is impossible to present a report on the small fruit activities alone.

THE SMALL FRUIT SITUATION

The 1954 commercial small fruit acreage in Virginia remains consistent with that of the past two years despite the slight reduction of strawberry acreage. Actual acreage set out in strawberries in the spring of '53 for this year's harvest would have given us a 1,500 acre increase, but for the drought over 1953's 4,300 acres. Drought conditions leading to poor stand of plants in '53, plus the shorten harvest season (drought) in many sections this past season resulted in approximately 4,200 acre crop. Nearly a ten percent acreage increase was set out to strawberries this past spring, and had plants been available there is little doubt that the increase of new plantings would have been doubled.

Grape and raspberry acreage increases went a long ways towards taking up slack of small fruit acreage deduction in strawberries caused by weather factors. Blueberries, blackberries and dewberries also showed increases with small commercial plants being made adjacent to larger centers of population. An

active demand accompanied by good prices for these berry crops continued to prevail and as a result there should be increased acreage set out this coming season, if plants are available. The lack of healthy planting stock is still the major hurdle to overcome, both in Virginia and the country as a whole, before a substantial raspberry industry becomes a reality. Blueberry plants of the more desirable new varieties continue to be either unavailable or prohibitive because of excessive high prices.

Special emphasis was placed in the development of small fruit acreage in counties where a large number of small low income farmers exist. Conferences were held with agents and county development boards (where such existed) to point out the feasibility of including one or more types of berries as a cash crop possibility in the overall farm program. Success stories were pointed out repeatedly where family scale plantings augmented the farm income as much, if not more than any other farm activity. The comparative low cost of initiating a one or two acre planting of strawberries and several other of the small fruit crops gave weight to logic that low income families should seriously consider the inclusion of a berry crop or two for cash purposes. This too would be in complete alignment with recent goals set by the Cooperative State and Federal Extension Service of doing more to assist the small farmer, who has insufficient acreage for livestock or general farming. What cash crops would fit such a policy program more appropriately than some of these small fruits? Especially where healthy market conditions exist, where the supply of berry crops in most areas of the state and nation is considerably behind the demand.

The development of the small fruit program is not without its problems. This is emphatically true despite the fact that on the surface it appears relatively easy to superimpose on the small farmer , who lives in the last

farmhouse, off the last lane down in some distant edge of the county". Few farmers have any knowledge of fruit culture and they quite naturally hesitate to raise a new crop with which they have had no experience. Moreover, the majority of the small farmers who need to revise their present farm program are less energetic, and consequently, they are the less progressive ones. This coupled with the fact that considerable hand labor is involved in small fruit production immediately sets up a need for a real selling job on the part of the specialist as well as the county agent. It goes without saying that many of the county agents themselves do not relish the prospects of including a county-wide small fruit program in their all ready full curriculum of activities. Such are some of the problems that must be faced in developing a successful small fruit program.

Continued cooperation has also been given to Veterans' Agricultural Classes this past year. The majority of these young men involved have small acreage farms where berry cash projects are ideally suited. In a number of instances veterans-on-the-farm-trainees become valuable cooperators in the overall small fruit program. Various demonstrations in farm visits have come about as a result of working with these young men and their instructors.

There has also been close cooperation with several farm home administrators in scattered sections of the state. Much as in the case of veterans-on-the-farm-trainees, many of the individuals coming under such a program are relatively new small farm owners and they need guidance in launching a profitable farm program. Here again small fruits are often times the answer to a need for a cash crop or two. These projects call for periodical farm visits in order to carefully bring into reality the needed cultural program.

It is necessary to continue developing the fruit phase of the home garden and as might logically be expected this activity falls within the responsibilities of the small fruit specialist. It calls for full cooperation with the county

home demonstration agents and their program with community demonstration clubs. Discussions and various demonstrations are very often involved. Undoubtedly, one of the more valuable segments of this program are the leader training meetings. For the most part these sessions are held with the vegetable specialist in order to develop the home garden as a more complete unit. This necessitates advance planning so that there will be both a permanent or perennial as well as annual section to the garden. The permanent section of the garden included the majority of the small fruit crops as well as such perennial vegetables as asparagus and rhubarb. I am also carrying family scale commercial fruit projects with home demonstrational women, who maintain food stalls at cooperative community markets.

The approaches used in developing home fruit production have included seizing the opportunities to carry discussions centered about small fruit culture to community and county-wide organizations. Many of these are either civic or church clubs. Included in this group are quite a number of young farmer clubs that have been mushrooming about the state and more often as not are outgrowths of farm veterans classes.

Cooperation has also been given to the vocational agriculture program. Requests for small fruit lecturers have been answered in the case of both vocational classes and adult groups in a number of different counties. In some instances farm visits have been made and demonstrations given.

Last but far from being the least to be mentioned in the summary of the situation and work done has been the 4-H program. Sponsors have been located who have been willing to underwrite the expenses in launching a series of strawberry and raspberry projects. In some instances the sponsors have been willing to provide cash prizes. These 4-H projects have been invaluable in selling certain areas of the state the possibility of small fruit culture, both as a commercial crop and as well as a health giving and tasty inclusion in the

home gardens". All activity with the 4-H program is included as part of my overall responsibility.

GROUP COOPERATION AND INTEGRATION

Leader Training Meetings and Demonstrations:

Leader training small fruit meetings were held with garden leaders of home demonstrations clubs in eleven counties located in northern and eastern Virginia. These sessions were requested by the county clubs because of the growing interest in small fruit culture, both for fresh eating and processing, (especially for home freezing, which continues to be on the increase). Small fruit discussion outlines were prepared and the information given in such a manner that it would fit into the overall gardening program. Small fruit culture was shown to be a substantial part of the permanent garden in which such vegetable crops as asparagus, rhubarb, horseradish, parsley and etc. are included. Such information was also mimeographed so that it might be included with the regular garden discussion outlines that were carried out to garden leaders in a majority of the counties in the state where garden leader trainings were being held by specialists of the vegetable section. This development of the permanent garden including such berry crops as raspberries, strawberries, blackberries, blueberries, grapes, and in some cases dewberries has gone a long way towards increasing the actual planting of berry crops in most areas of the state.

At times demonstrations were held in conjunction with leader training meetings. These sessions covered such cultural techniques as site location, plant setting, summer mulching, training, pruning and fertilizer application. Cooperation was given to a number of the home agents, who desired an overall demonstration of a home fruit planting to be carried down from plant setting to harvest.

County Wide and Community Meeting:

Six county-wide meetings with 340 men and women in attendance and eight small fruit sessions were held with 315 individuals at their regular community club get-togethers. For the most part the small fruit discussions at these sessions were developed around the recommendation of the the berry crops for home plantings, and also in a majority of instances the unusual good possibilities that these same fruits would have as a commercial cash crop were pointed out. Thus it was that in addition to outlining the cultural prerequisites there was always a good amount of time devoted to the marketing outlook. Numerous illustrations were given where in most sections of the state the demand for a small fruit crop lagged behind supplies. In fact it was stressed that often times during the peak harvest seasons in many communities and persons were unable to obtain small fruits in the markets, hotels, restaurants, and etc. Civic clubs and young farmer clubs were responsible for my giving an additional eight small fruit lectures. These were pretty much on a community basis, and here again the commercial possibilities of these berry crops were stressed as well as to point out that how ideally these crops would fit into the home garden situation. This specialist also set in on a half-dozen county planning meetings where it was thought desirable to explore the possibility of commercial small fruit growing.

Veterans Classes:

Small fruit lectures and discussions were held with regular veterans classes in five different counties. This was in answer to requests coming from veterans' teachers through county agents and primarily that aim of such sessions was to promote interest in the commercial possibilities of these berry crops. It was commonly understood that the majority of these young men owned small farms and were constantly in need of selecting cash crops that would fit in there overall farming program. Therefore, it is not surprising that some of the most worthwhile

berry projects were carried by these veterans and as a result increased commercial acreage of strawberries, raspberries, blueberries, and grapes have become established. Often as not, these small fruit crop introductions were made in areas of the state where the diversification of farming activities are considered a "must".

Other Group Activities:

Once again this writer reaches a point where it is necessary to group together a number of different meetings and conferences that do not logically fall into a special type of activity. A fair amount of our time was devoted to these sessions and their importance cannot be overlooked in the overall program. The Cumberland-Shenandoah Professional Fruit Workers' Conference and fruit tours of which there were three were vitally important, for it is during these periods that specialists from this state and neighboring states have an opportunity to exchange developments and ideas. Similarly, the American Horticultural Science Meetings attended at the University of Florida proved to be excellent professional improvement, and allows for an immediate application of the research work that has been concluded the county over. The Del-Mar-Va Meeting is still another example of a three state activity, which takes place annually on the Eastern Shore. Discussions at these sessions appropriately are centered about small fruits and vegetable crops, which go to make up a large part of the overall agricultural program in that area. Participation was also taken in several county tree fruit association meetings, horticulture short courses, beekeepers and pest control schools, as well as in-service extension short courses. These activities often offer a splendid opportunity for sponsoring and carrying out segments of the small fruit program. Also worthy of mention are the weekly horticultural seminars and the monthly extension specialists and agricultural faculty meetings. There is also always the attendance and participation in the annual extension conference as well as the Institute of Rural Affairs.

Publicity:

Radio, television, daily and weekly newspapers, as well as through such periodicals as Extension News, Virginia Fruit and certain farm publications were used as mediums for circulating pertinent subject matter having to do with special fruit crops such as nuts and berries.

Twenty-seven radio releases were handled either by live broadcast or through tape recordings. Many of these radio programs were in connection with special projects or small fruit activities in certain areas of the state. For example, Frank Raymond, Farm Program Director for WOTB of Bristol, would come to Lebanon, Virginia for tape recordings explaining our endeavors in an attempt to form a production and marketing association for a cooperative approach in handling certain small fruit crops commercially.

Television programs centered about small fruit educational activities were held at Roanoke, Danville, Richmond and Norfolk. Granted, this type of publicity approach is limited at the present time, however, its future possibilities seem very bright indeed. Time was also devoted to developing props that were used for these and future programs.

SMALL FRUIT PROJECTS

Strawberry Projects:

Strawberries, once again, proved to be one of the Old Dominion's foremost cash crops. Berry growers in nearly every county realized substantial farm income from an active strawberry market and resulting good prices. There is no question that dry weather was an adverse factor in certain few areas, but for the most part the commercial growers harvested and sold a high quality crop. This was especially true in the Eastern Shore counties, where the bulk of the commercial crop is grown. It is an accepted fact that the strawberry crop was a salvation of many of the truck farmers in that area in as much as drought and low prices had there disastrous effects on most other crops being produced.

The strawberry harvest in the United States in 1954 was 109,350 acres, and this is 12% below the past five-year average. The indicated acreage to be harvested in 1955 is 108,800 acres and this is approximately thirteen percent below the five-year average. Reductions are most pronounced in Louisiana, Arkansas, Oklahoma, and Missouri where drought curtailed new plantings and caused a loss of established acreage. Significant increases in acreage over last year are indicated in Florida, Tennessee, California and Oregon. A prospective 1955 strawberry acreage of 22,200 is indicated for Virginia by the Virginia Cooperative Crop Reporting Service, and based on reports from growers as of October 1. There seems to be a considerable doubt as to the accuracy of the figures reported as against the actual acreage that is to be harvested. However, based on this report the overall acreage would be eight percent less than that harvested in 1954, and four percent below the five-year (1949-53) average. After two years of drastic reductions the acreage trend apparently ~~has~~ about leveled off. Dry weather thinned out some fields, but as a whole the crops came through the summer in good condition. Growers report that nearly two-thirds of the acreage intended for the harvest next spring consist of new beds. This fact coupled with the national report points to prospects for a healthy market and resulting good prices.

Approximately one-third of my field activities are devoted to promotion and servicing of strawberry production and related project work. Cultural and marketing information for commercial strawberry production generally heads the subject matter normally discussed at section, county, and community meetings. In addition to requested grower assistance projects and demonstrations embracing such practices as plant setting, spacing, varietal trials, fertilization, renovation, irrigation, harvesting, summer and winter mulching, insect and disease control, weed herbicides, were carried out.

Strawberry projects result from cooperative efforts with nearly every segment of the group activities carried out. This applies to the phase of my small fruit program carried out with home demonstration clubs and their garden leaders, veterans and young farmer organizations, cooperation with processing concerns, and most especially as a result of my 4-H club program.

4-H Strawberry Projects

It was pointed out in my 1953 annual report that the 4-H strawberry project was becoming an increasingly more important part of my overall small fruit program. This proved to be still more evident this past year with 4-H strawberry projects not only being a worthwhile club activity, but also very profitable. These projects have aided immeasurably towards convincing farmers in certain areas of the state where it has been difficult to get adult projects underway, that the strawberry deserves special consideration as one of the cash crops to include in a farm program calling for diversification. Fifty-six strawberry projects were carried with the 4-H young people in twenty-one counties. These projects are normally held to one-fourth down to one-tenth of an acre each. It is quite understandable that normally strawberry projects are carried by 4-H young people (both boys and girls) who are not afraid of hard work and "can fit their hands about a hoe handle". Credit can be given to 4-H projects in as many as a dozen counties where commercial plantings are being developed by farmers for the first time. It is most worthy of mentioning that for the most part the majority of the commercial plantings are being carried by small farmers who have been in desperate need of increasing their farm income.

It is an accepted fact that all adult and young people's projects depend upon farm visits to insure success. This is especially true in strawberry 4-H projects, which are much like vegetable garden projects in as much as they have little glamour and consequently, less appeal to 4-H young people. Because of the hard work requirements of such backbending chores as weeding, plant setting,

Raspberry Projects:

Raspberry project activity has been expanded to 22 counties and the majority of these are located in Southwestern Virginia where altitude and soils come nearer meeting the basic requirements for the optimum production of this much in demand small fruit crop. Prices paid for this berry crop were excellent, both by fresh market and processor buyers. Supplies the country over were very limited and as a result Virginia concerns who are putting up a frozen jam and jelly and ice cream mix packs were highly competitive in their bidding.

It was necessary to devote more time to assisting both raspberry growers and potential growers. The increased amount of servicing to present growers was to inspect disease and insect conditions and to make appropriate recommendations. Also a more thorough series of demonstrations were carried out with summer topping, pruning, disease planting, summer mulching, and herbicide application. There continues to be potential in the use of chemical weed control materials.

Perhaps one of the greatest services in assisting the raspberry project in 1954 was the location of plants for potential new growers and those who are expanding present plantings. The scarcity of plants due to drought conditions of the last several years created an acute condition, and, it was, therefore, necessary to scour the eastern section of the country for these needed plants.

Raspberry 4-H Projects:

4-H projects with this small fruit were gotten under way for the first time since this specialist took over the 4-H fruit program. A sponsor was found for these projects - The Old Virgin Packing Company of Front Royal. The projects were outlined and offered to Wren, Rappahannock, Madison, Page and Shenandoah Counties. Actual plantings were finally started with a half-dozen boys in Shenandoah and Madison County. This past season two visits

were made to these raspberry projects, and though drough conditions took a rather heavy toll of plants, the overall condition of the projects were held to be above average. There seems to be considerable likelihood that the "spade work" in the other counties concerning raspberry projects will lead to active participation another year.

Vineyard Projects:

Grape project activity and grower cooperation were given to vineyardist in sixteen counties located in scattered areas of the state. Problem visits and demonstrations were carried out in a large percentage of the visits. Cultural phases stressed were all the way from plant setting, training, spraying, harvesting, pruning, and trellising. Seven grape pruning and training demonstrations were held in conjunction with the garden leader training program carried with the home demonstration clubs.

Special mention is made in the 1953 report of the chemical weed control trials and the assistance given towards developing fresh market outlets for some of the larger vineyards, who in the past were delivering their grapes primarily for juice. Cooperation in the chemical weed control trials were received from Dr. William Chappell and John Amos, both located here on our VPI staff. Herbicide materials were obtained gratis from chemical concerns and making it much easier to obtain coope-rators. A number of the past coope-rators have now gone to the expense of obtaining herbicides and do considerable weed control work over the entire vineyard.

The success with fresh marketing in Eastern bunch grapes of Virginia vineyards has been most encouraging. A number of our growers have been handsomely rewarded for their additional trouble to pack in twelve and sixteen quart containers and selling them to chain store channels of this state as well as adjacent ones. Naturally, the success in fresh marketing and resulting good ~~prices~~ have stirred interest in new plantings, and subsequently, it

became necessary to spend more time determining sites and outlining the cultural steps required.

The following are some examples of vineyard projects that have proved profitable as a result of our cooperative extension program:

The Paul L. Wenger, a nine acre vineyard on Route 2, Waynesboro, "has netted an excessive of \$6,000/yr the past two years", as a result of careful management and marketing program. Demonstrations including pruning, and spraying, as well herbicide and fertiliser trials have gone a long ways towards contributing to this profitable margin. Perhaps most important was the identification, and sorting of the many varieties in the Wenger vineyard. This enabled the sale of a large number of cuttings to nurseries.

The B. C. White, five acre vineyard, located in Castlewood, Virginia. Herbicide and spray trials assisted immeasurably towards the success of this vineyard. The fruit was actively marketed in nearby roadside stands.

The Beach Creek Vineyard at Seneca continued to show a good profit after a very unusual harvest of grapes a year ago when the vineyard was only in its second year. This ten-acre planting has been developed through close cooperation with specialists, who have given detailed recommendations and demonstrations. Early success in marketing through chain store channels has been the outstanding feature and it points to unlimited grape marketing possibilities. This vineyard has made possible rather exhaustive varietal trials, in cooperation with the Experiment Station. It gives us an important check as to new grape variety possibilities for the Eastern and Tidewater areas.

Blueberry Projects:

Considerable effort was again placed towards this newest phase of the small fruit industry. The ever increasing demand for this berry crop by both home and commercial channels results in rather substantial interest in the growing of blueberries. Rather special prerequisites leading to success-

ful plantings predetermine a slow acreage increase. The majority of the new plantings this past season have been about one acre in size, and were scattered about the state and adjacent to large population areas. Fertilizing, mulching, and varietal trials head the list of activities carried out with these new growers.

Trader-Wessel's blueberry project was launched in the spring of 1949 on the Eastern Shore. It was the first of an accumulating number of such projects. With very few exceptions these projects have been doing very well and showing a neat profit. The original projects sponsored by John Dullanev and Sons, of Emore, have done much to stimulate interest in commercial blueberry production in that section of Virginia. Irrigation of this project this past season has allowed for some very interesting trials where heavy sawdust mulch was contrasted with irrigation. New blueberry projects were started in Norfolk, Princess Anne, Lancaster and Russell Counties, and the two Eastern Shore counties.

Miscellaneous Fruit Projects:

The BLACKBERRY acreage is slowly on the increase in the Old Dominion. Here again the increase is due to primarily to cooperative blackberry projects being carried out through vegetable truck growers located near some of the larger cities. This past year emphasis was placed on the proposed sterility factor of many blackberry plantings. Spray trials including D.D.T. at the bloom stage verified the New York State Experiment Station discovery that the tarnish plant bug is the chief culprit accounting for the blackberry non-fruiting habit. Pruning demonstrations including both summer topping and early spring reductions of laterals have gone a long way towards providing growers with thriftier plantings, and that are at the same time more manageable. Canes headed back to 24" to 26" with short laterals contain superior fruiting wood and they remain sturdily erect even under full fruiting conditions.

The work done with DEWBERRIES is pretty much limited to the Norfolk, Princess Anne, and the Eastern Shore areas, where the mild winter weather conditions, do not cause winter killing of the fruiting cane. This winter damage to Boysenberries in most other areas of the state makes it necessary to caution prospective growers and persuade them to other types of production. Several spray trials were conducted to show control possibilities of the increasingly prevalent cane borer pest.

FIG production with a few scattered exceptions has been a home fruit activity, and much as the case of dewberries is limited to warmer areas of the state and generally adjacent to larger bodies of water. Varietal trials and nematode control is the basic project activity being carried out with this ancient fruit. The hardier varieties of Celeste and Brown Turkey have been fruited successfully, and as a result are being included in a great many home fruit plantings of Eastern Virginia. The limited amount of fresh marketing is carried out on the Baltimore-Richmond and Norfolk markets.

Project activity with the stone fruits, Cherries, and Damsons is mentioned here for a want of a better spot in the overall report. Cooperative projects being carried with commercial small fruit growers and those sponsored by a fruit processing concerns often include cherries and damsons along with the berry crops. For the most part cultural recommendations with emphasis on the proper spray program was given to growers. Special attention was given to including the newest fungicide and insecticides and spray trial observations of the same resulted in keeping up to date. These observations confirming findings in other state Experiment Stations offers a reasonably safe basis for recommending these materials.

Nut Projects:

The responsibility in the nut project activity was accepted again this year, and considerable time and energy was devoted to this phase of my

program. It is necessary to carefully select cooperators who are willing to follow through with the prerequisites for the care of the nut trees, which are procured from the Tennessee Valley Authority. The types of nut trials handled in 1954 were Chinese Chestnuts, Filberts, and Blackwalnuts. The Chinese Chestnut cooperators are as follows:

Ben Lacey, Freezeland Orchards, Linden, Virginia; J. F. Blair, Chatham, Virginia; J. D. Ashley, Route 1, Box 241, Rustburg, Virginia; E. T. Kyle, Box 333, Route 14, Richmond, Virginia. For the most part all the outstanding new Chinese Chestnut varieties the Meiling, Hanking, and Kulling are being included.

The Filbert Cooperators selected were as follows:

L. L. Ferrish, Estes, Virginia; B. G. White, Castlewood, Virginia; Polly Metheny, Route 2, Hot Springs, Virginia; J. T. Tetum, Route 2, Salem, Virginia; Guy L. Ferguson, Route 2, Salem, Virginia; G. C. Lovill, Mt. Airy, North Carolina; Jack Franske, Denbigh, Virginia; and A. H. Teske, Blacksburg, Virginia. The Filbert types are still unnamed and are listed as 1055, G, 172.

Varieties included in the Blackwalnut trials are Schriver, Thomas, and Staller. Unfortunately, the drought conditions this past growing season raised havoc with many of the plantings placed out, and consequently, the stand of trees were not as good as in the past year. Work has already been received that another year replacements will be made available for the trees that did not survive the dry weather conditions.

Respectfully submitted,

H. Bruce Arcian

H. Bruce Arcian
Associate Extension Horticulturist

VIRGINIA
(State)

AGRICULTURAL EXTENSION SERVICE

HORTICULTURAL
(Name of Project)

PLAN OF WORK

For

CALENDAR YEAR OF 1954

<u>Major Phases of Project or Subdivisions of Project Covered</u>	<u>Name of Worker</u>	<u>Percentage of Time Devoted to Entire Project by Each Worker</u>
Fruit Growing	A. H. Teske	100%
	F. R. Dreiling	100%
	H. B. Arcian	100%
	W. P. Judkins	33 1/3%

Date Submitted: 4/20/54, 1954 Signed: A. H. Teske
Project Leader

Date Approved: 4/22, 1954 Signed: W. H. Doughty
State Director of
Extension

Date Approved: MAY 14 1954, 1954 Signed: C. E. Ferguson
Director of Extension
Work, U. S. Department
of Agriculture

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
VIRGINIA POLYTECHNIC INSTITUTE AND THE UNITED STATES
DEPARTMENT OF AGRICULTURE COOPERATING

STATE OF VIRGINIA

V. P. I. AGRICULTURAL
EXTENSION SERVICE

Mr. W. H. Daughtrey, Director
Virginia Agricultural Extension Service
Blacksburg, Virginia

Dear Director Daughtrey:

I wish to submit a plan of work for the extension program in fruit growing for 1954. The objectives of this plan are to meet the needs of the fruit growers of the state and allied industries of Virginia which play such an important part in the well being of the state's horticultural industry. It is felt that this 1954 plan of work will be valuable in assisting growers and others in meeting their many problems.

Apple production in Virginia in 1953 was low and disappointing. The crop was a little more than 6 1/2 million bushels. Because of the very dry season the fruit did not attain size, and as a result, there was a large amount of small apples. Production costs were high, but prices were better than they had been for a long time. Color and finish were much above average.

Peach growers fared better than they did in 1952. Quality and color of the fruit were excellent and prices satisfactory. The prolonged dry weather had its effect on best size and tree growth.

Fruit tree population including both apples and peaches continue to decline, and the industry has reached a point where more consideration will be given to increasing plantings.

Greater production of citrus and other fruits is resulting in keener market competition. Along with this has come a greater consumer demand for fruit of better quality, larger size, higher color, and better finish and condition. To handle the kind of fruit desired by handlers and consumers rapid changes are taking place in the field of transportation, conditioning, packaging, and retailing of fruits.

The need, then, is for greater mechanization in the production and fruit preparation, for packaging and storage. Ways are needed for reducing costs, stabilizing, and improving yields.

PERSONNEL

W. F. Judkins, Head of Department of Horticulture, devoted one-third time to extension in fruits, vegetables, and ornamentals.

H. Bruce Arcian, Associate Horticulturist, full time extension in small fruits.

Fred R. Dreiling, Associate Horticulturist, full time tree fruits.

A. H. Teske, Horticulturist, full time extension in tree fruits.

PRODUCTION TRENDS IN UNITED STATES

Total fruit production for the United States is expected to continue high in the future. Citrus production is still on the increase. The trend in sour and sweet cherries will continue up. Peach production has declined from the peak in war years, and this decline is expected to continue for the near future. Apple production is still on the decline and will continue for some years to come. Present indications are that the apple crop in 1954 will be larger than in 1952 and 1953.

PRODUCTION TRENDS IN VIRGINIA

In Virginia peach tree acreage is still on the decline, and for the immediate years ahead the production should be rather stable at the 1 1/2

million bushel mark. There is need for new plantings of peaches in Virginia.

Where there has been a sharp trend to the earlier maturing varieties than in Elberta in all of the more important southern peach producing states, Virginia growers have been more reluctant in making plantings on a large scale of such varieties. Also, with heavier production of earlier varieties in the above named states, it should make for a better demand for Elbertas from Virginia if greater consideration is given to the production of peaches of large size, proper maturity, and handling.

With the sharp drop in apple tree numbers in Virginia in recent years, production will continue to decline. However, because of the very light crop in 1953 and the favorable weather for fruit bud formation, it is indicated that the apple crop in Virginia in 1954 could be several million bushels larger.

In recent years several new plantings of sour cherries have been made, and sour cherry production should show some increase for the years ahead. It promises a splendid crop for diversifying fruit tree crops.

Trend in Demand

Demand for fruit in 1954 should be better than in 1953 when production was below average for apples and peaches. With an anticipated larger production of these fruits in 1954, prices may not be as high as in 1953. The outlook for improvement in fresh fruit demand is encouraging because of improved quality, better handling, grading, and packing.

The processor demand should be strong, since carryover stocks will be well cleaned up and because of the increase in per capita consumption of processed fruits. In 1953 processors packed more than 11 million cases of sauce alone, not to mention sliced, baked apples, etc. It is estimated that consumption could be increased to the extent that it would require 40 million cases of sauce to meet the demand.

Container Trend

The trend to consumer package is sharply upward. The standard bushel basket is being rapidly replaced with boxes and other containers that will give greater protection to the fruit in handling, to save storage space, facilitate handling, and provide for improving fruit condition until it reaches the consumer. There is great need for container standardisation.

Quality Trend

Fruit growers are becoming more quality conscious to meet the ever increasing demand by consumers for fruit of higher color, larger size, and better finish. Likewise, processors are becoming more quality and size conscious in order to reduce unit producing costs and improve their pack.

THE 1954 FRUIT SITUATION

The fruit situation for 1954 appears favorable. The outlook at the present time indicates a higher total production of the major fruits for the coming year, which, while costs will remain high, should result in a lower unit cost.

While there has been some increase in unemployment, indications are that consumer income will be relatively high in 1954; and with the rapid increase in population, consumption should be well maintained. Consumers will also become more thrifty, and this should encourage more canning and fruit use, especially if fruit quality continues to improve.

THE 1954 APPLE SITUATION

The apple picture at the present time appears favorable. Holdings from the 1953 crop are moving out satisfactorily, and the supplies should be taken up before the new crop appears. The short crops of 1952 and 1953 should encourage a strong demand for early in the harvesting season of the 1954 crop.

Storage holdings of the 1953 Virginia crop were light, and while Virginia has prospects for a ten-million-bushel crop of apples for 1954, this production can be marketed without any trouble if the marketing and movement programs are well planned in advance.

THE 1954 PEACH SITUATION

As with apples, much peach acreage has been removed in recent years, and production is far down from the record production during the war period. The variety picture has changed materially. Elberta is being rapidly replaced with earlier ripening varieties of higher quality. The movement picture is also changing with greater volume of peaches moving into the markets earlier. This should have a tendency to reduce periods of market gluts. With more peaches moving earlier, Virginia's Elberta crop should have a favorable market outlet.

Another improvement, and one which should encourage greater consumption of peaches, is that producers are allowing the fruit to reach more the tree ripening stage before harvesting.

THE SMALL FRUIT SITUATION

With a greater interest in using small fruits in the fruit tree diversification program, the planting of small fruits should show an increase in the future. Small fruits are ideal for freezing, and the demand should increase.

ADJUSTMENTS

In analyzing the fruit industry of the state, it is important that careful consideration be given to the outstanding needs and problems to bring into being a well balanced industry. Virginia has always been one of the top ranking apple producing states. The soils and climate of the state are well adapted to the production of apples and other tree fruits as well as small fruits. Virginia's production is strategically located with reference to

fresh fruit markets, and in its border are located large processing plants.

The sharp decline in apple and peach tree numbers during the past ten years and the fact that this situation has prevailed in other large fruit producing areas indicates a good future for the industry. It appears, therefore, advisable to encourage new plantings on a rather large scale. The responsibility of the Extension Service is to make sure that these new plantings be located on the very best sites and soils in order that production may be stabilized. Growers will need guidance and assistance in the selection of proper varieties, planting methods, and cultural and orchard management practices.

Much research is being devoted to marketing problems. This is as it should be, but basic to the successful marketing of fruits is that of producing the kind of fruit that markets and consumers prefer. Preference for fruit of high quality, large size, high color, finish, and condition is on the increase. Stability of production and the know-how to get the desired results must be given first consideration by the fruit industry. Growing costs are extremely high and paramount to the production of high quality fruit is that of lowering unit costs if competition is to be successfully met and market outlets widened.

Practices that will fulfill production requirements must be found and adopted. While considerable progress is being made in mechanization, there is still much to be done in this field. The fruit growing extension program contemplates adjustments that will best meet the needs of the industry.

Research Needed

1. Further research studies on thinning apples and peaches with chemical sprays.
2. Research studies on spraying with concentrates.
3. Research work on materials and methods for improving finish of apples.
4. Study effect of chemical thinning sprays on size, yield, and fruit bud formation.

5. Research work needed on dwarf trees.
6. To study effect of soil conditioners on aeration, cover crops, and yields.
7. A study of methods to correct soil compaction.
8. To study effect of tree structure on size, color, yield, and finish of fruit.
9. To study effect of type of growth on fruit set.
10. To study influence of cultural practices on fruit color and finish.
11. Study to improve methods of preventing fruit bruising.
12. Study to improve carrying qualities of peaches.
13. Study of fruit containers.
14. Study effects of subscioning on tree mortality and performance.
15. Continue an enlarged research on pre-harvest sprays.
16. Research study to improve size of Ambergen peaches.
17. Research study on irrigation and water supplies.

Major Extension Efforts Will Be Devoted to Meeting the Following Pressing Problems

A. To Improve Quality and Finish of Fruit

1. By reducing the production of low-grade fruit by pruning and thinning.
2. Stress insect and disease control with materials and sprays that are less injurious to fruit finish.
3. Stress better management of cover crops to reduce competition to trees for food and moisture.
4. Increase annual yields of fruit of larger size and better color through cultural practices.
5. Adjust production to consumer preference and processing outlets.

B. To Improve Yields

1. Stress better pruning to remove weak wood, to secure better distribution of light and a greater uniformity of vigor.
2. Stress proper use of fertilizer as to kind and time of application.
3. Stress improved methods of rodent control.
4. Stress importance of time in cultivation, mowing, and mulching of cover crops.

C. To Reduce Costs

1. Stress mechanization.
2. Stress greater use of brush removal.
3. Stress greater use of concentrates by developing concentrate programs to fit needs of individual orchards.
4. Adjust production to consumer preference and processing outlets.
5. Develop and stress efficient methods in harvesting and packing operations.

D. To Improve Fruit Condition

1. Stress careful handling of fruit.
2. Improve grading and sizing equipment.
3. Stress the need for more rapid movement of fruit from tree to storage and market.

4. Secure improvements in cold storage operations, especially in equipment for handling fruit more carefully in and out of storage.
5. Secure greater cooperation between handlers, storage operators, and producers.

E. To Improve Market Outlets and Distribution

1. Stress higher standards in grade and pack.
2. Make available more timely crop and market information to assist the industry in seasonal movement of varieties.
3. Secure a greater working together of handlers and producers for better distribution.

F. To Improve and Stabilize Fruit Growing

1. Stress surveys for new planting sites.
2. Develop and stress use of intercrops for young fruit plantings.
3. Stress increased diversification of fruit crops.
4. Stress increased production of small fruits in the tree fruit industry.

Organization

In order to secure statewide results of the adjusted Extension fruit program and quicker acceptance of progressive methods and practices, greater organized efforts will be necessary. Grower fruit associations will be most important in developing top leadership in securing the widest participation of the Extension program. To further the program, monthly and orchard field meetings will be conducted to a greater extent in 1954.

Spraying

Much progress is being made in developing spray chemicals that are more efficient for insect and disease control and which at the same time are effective in improving size, color, finish, and keeping qualities of fruit. Spraying is perhaps the most costly of all fruit growing operations, but while the newer spray chemicals are high in price their use is justified, especially on varieties that are sensitive to injury from certain spray materials.

Much demonstrational work is required to secure the know-how as to their compatibility when used in combination with different insecticides and fungi-

icides and in order to develop spray programs that will at the same time reduce costs. The use of improper materials is costly to the grower. Spraying operations if not timed properly are in poor control.

The use of concentrate sprays makes possible sharp savings costs and are less likely to cause injury to foliage, fruit, and finish of the fruit. In 1954 extension efforts will be expanded on the spray project. The work on chemical thinning sprays will be given special attention.

Pruning

Mature Fruit Trees

This orchard practice continues to be one of the most critical jobs to accomplish in striving for high quality fruit. Effective pruning is a must for fruit that is to meet competition in today's market. With higher labor wages and record employment in industry a fruit grower finds it extremely difficult to carry out this vital operation. A thorough complete job of spraying for insect control is impossible without adequate pruning.

With this picture in mind, it is of utmost importance that the growers mechanize with pneumatic power pruners and manage their pruning operation more efficiently. Power pruning equipment will be used in pruning demonstrations for all fruit producing areas of the state. Emphasis will be placed on getting growers to participate in the demonstrations and using these power tools. This will allow for additional firsthand instruction on how the equipment is to be used. Greater stress will be placed on the use of pruning platforms which offer an additional advantage of more rapid pruning and a better pruning job. Discussions on the importance of good pruning and the advantages of power tools will be undertaken at grower meetings, at fruit schools, and during orchard visits. Continued emphasis will be placed on the

removal of weaker parts of trees in an effort to produce higher quality fruit.

It is planned that a more complete collection of pruning slides be made this coming year for use at grower meetings. Additional visual aids in the way of photographs, sketches, and movies will also be used in emphasizing thorough and complete pruning in our Virginia orchards.

Young Fruit Trees

With the shortage of labor in the orchards it has become increasingly difficult to get the proper pruning of young trees. Growers are inclined to neglect the younger trees because they are not a producing unit. This requires a continual re-emphasis on the importance of establishing a desirable framework. The pruning of young trees will be included during each of the demonstrations having to do with bearing trees. Besides the method demonstrations, result demonstrations are being continued in a number of counties. It is planned for the coming year that we circulate to a greater extent literature having to do with the training of young trees. This will be accomplished through our grower mailing list, at grower meetings, and for continued study by the growers after the scheduled pruning demonstrations. Research is needed on the pruning of fruit trees as it relates to the use of new methods of spraying.

Rodent Control

Rodents and particularly pine mice, are perhaps the number one cause of high mortality in fruit plantings. They are not only responsible for the highest death rate in fruit trees but are one of the main factors causing a large percentage of low-grade fruit. The present methods for rodent control are costly, time consuming, and require very conscientious effort in order to secure proper results. There is a growing need to develop a more efficient method of control. Much more effort with poison ground sprays will be conducted in 1954 consisting of demonstrations and meetings.

Cultural Practices

Moisture is one of the most important factors in securing high yields of large sized, well colored fruit with good finish. Since irrigation is not possible for most fruit plantings, the problem of conserving moisture through cultural practices becomes of great importance. Aeration, improvement of soil texture, and cover crop management as well as proper nutritional balance become of outstanding value and importance. To this end, greater emphasis will be placed upon adjustments in fertilizer programs. Information on determining needs for scarcer elements will be secured through demonstrations. Timing fertilizer applications will be given more attention. Demonstrations in cover crop management will be enlarged, and timely information through meetings and other means will be used to inform growers.

Pollination

Inadequate interplanting of pollinating varieties in orchards where intersterile and self-sterile have been planted in large blocks has been one of the main factors for low yields and the cause for tree removal. In the older plantings special extension efforts are being directed to correct the situation. In new plantings stress is being placed on proper interplanting of satisfactory pollinating varieties.

Thinning

All market outlets are giving added preference to large sized fruit including processing plants. It is becoming increasingly difficult to dispose of small fruit. The general trend is to harvest fruit on a piece-work basis. It is becoming more difficult to get the small fruit picked. Small fruit encourages rough handling in picking and packing operations, and it requires more supervision to get the trees picked clean where there is fruit that is undersized.

To reduce the production of small and inferior fruit is one of the toughest problems of the industry. Thinning offers one of the most effective means of solving the small fruit problem. Hand thinning under the present shortage of labor and high wages is almost out of the question. For these reasons stress will be placed on mechanical and chemical thinning methods.

Expansion

Apples: The sharp decline in bearing apple trees in Virginia during the past ten years is causing growing concern among growers and allied industries. There is, therefore, an urgent need for increased apple plantings, and this part of the extension program in tree fruits will be given greater consideration. An important part of this expansion program will be the soil and site survey service in order to assure greater efficiency in production and stabilization of the industry. In addition, all possible assistance will be given growers in the selection of varieties, arrangement of varieties to insure proper and adequate pollination, and in providing proper balance in varieties so that all available outlets may be taken advantage of without causing unnecessary marketing gluts.

Peaches: Peach plantings have been increased materially in Virginia beginning with the early thirties. Many of these plantings have been made on marginal sites. Virginia is in a favorable spot from the standpoint of marketing peaches. It is anticipated that peach tree population will decline in some of the larger southern peach producing states, and if this should materialize, it would appear that some expansion in peach plantings would be advisable. Moderate expansion will be encouraged in Virginia as a whole, with a stepping up of plantings in certain sections where conditions warrant. Stress will be placed on site selection, soils, and varieties.

Cherries, Plums and Pears: These fruits have not in the past been grown commercially on an extensive scale in Virginia. For a number of years test

plantings have been encouraged, and a number of plantings of each of these fruits have been under observation. The results from these plantings indicate that sour cherries, plums, and pears can be grown satisfactorily in a number of sections of the state when located on the proper soils and sites. The returns from sour cherries have been as high as from apples. Demand for these fruits has increased both for fresh fruit and processing purposes. There is a great need for fruit diversification, and with the suitability of these fruits for this purpose and their place for increasing income and greater balance in fruit plantings, more stress will be placed on expanding acreage of them.

Small Fruits: The program for expanding small fruit acreage and for improving yields and marketing will receive greater attention in 1954.

Marketing

The value of fruit is determined by the quality, condition, and appearance of the fruit when it reaches the markets and consumers. To attain those fruit objectives it is of increasing importance to harvest, handle, and distribute fruit in such a manner that it will have the greatest value when it reaches the consuming public. To make the 1953 fruit crop contribute most to the satisfaction of producers, handlers, and consumers, adjustments in the following are planned for the coming year, in order to expand the improvements secured during the past two years.

1. Rough handling bruises fruit, makes for waste, causes losses, and detracts from the appearance of the fruit. A series of worker training schools are planned for 1954 to instruct workers in proper handling of fruits.
2. Marketing clinics will be held with growers, handlers, and retailers cooperating to provide information for the following.
 - a. The fruit supply situation.
 - b. Varieties, the season of movement and distribution by areas.

- c. Grade requirements and color preference by outlets and distribution areas.
- d. Size variation preference by markets.
- e. Pre-package container trends.
- f. Methods and place for packaging.
- g. Prices and margins.
- h. Fruit displays
- i. Handling to reduce waste.
- j. Storage operation and handling.

3. During recent years and in particular in years of short crops, as has been the case in Virginia since 1943, standards have been lowered, but with the larger crop in prospect in the state in 1954 it is important that efforts be increased to raise the standards.

Poor grading and packing encourages waste and lower prices. Careless handling and packing result in slack packs and make for sales resistance. Much has been accomplished in recent years. Further improvement can be made by more use of better equipment, greater mechanization, and more efficient arrangement of grading and packing machinery to reduce handling of fruit by workers. Job assignment and training will be stressed. A series of grading and packing schools are planned for 1954.

4. Proper varieties to meet trade and consumer demand together with ability to produce high yields are essential to satisfactory production and ready market acceptance. Greater consideration will be given to varieties in the new plantings. Top-working of older trees of poor quality will be suggested as well as unprofitable varieties. Cultural practices to improve quality and appearance will be stressed as well as hormone and other sprays.
5. Apples are especially suited for holding in storages at the point of production to secure better market distribution. Individual storages at the orchard make it possible to move the fruit into cold storages immediately after it is harvested. In this way the life of the fruit is prolonged and loss and waste are reduced. The trend is more and more to fresh packaged

fruit. Consumer packaged fruit is on the increase. Running fruit directly from the trees into cold storage without grading and packing it has distinct advantages under present marketing conditions. The trend is toward fresh packs, and such a method makes this possible. It avoids over-filling, slack packs, and affords the consumers a better knowledge of the condition of the fruit. New methods of removing fruit heat are needed for long-term storage fruit. Adjustments in this direction are being encouraged, as well as better methods of public cold storage operation.

6. Progress is being made in the improvement of transportation, packaging, and marketing. In recent years there has been a greater interest in the use of boxes as a package for Virginia fruit. Boxes offer many advantages in preserving quality, improving conditions, and lowering transportation and handling costs. Boxes give greater protection against bruises, reduce rough handling and require less space in transportation and storage. They also provide a means of handling and transportation of tree ripened fruit. Adjustments will be encouraged and stressed to meet these important developments.
7. Low-grade fruit and the disposition of it has been one of the most serious marketing problems of the fruit industry. Such fruit does not make the highest quality processed product. Expansion of outlets for processed fruits is dependent upon quality of the product. Development of new fruit products will be encouraged.

Remedies and Changes

1. Through better organized effort, increased understanding between producers, handlers, and processors of mutual problems in order to secure the widest cooperation for helping growers make needed adjustments which will contribute most to the present and future of the whole industry that will bring about greater stabilization are the objectives of the extension program.

2. Adjust production and marketing operations to meet changing conditions.

- a. Stress importance of good sites and soils in fruit plantings.
- b. Discourage plantings on marginal sites.
- c. Remove varieties of poor quality.
- d. Stress removal of undesirable fruiting wood.
- e. Reduce height of bearing trees to lower production and harvesting costs and improve quality.
- f. Improve feeding program for fruit trees.
- g. Use better varieties to widen outlets.
- h. Secure proper arrangements of varieties for adequate pollination.
- i. Improve thinning methods and practices.
- j. Encourage expansion of fruits.
- k. Adopt use of suitable cover crops.
- l. Improve cover crop management.
- m. Improve practices to secure better cover crop growth.
- n. Secure better rodent control.
- o. Improve and develop orchard equipment to speed up production and

3. Improve marketing through:

- a. Cooperating with state and national apple and peach councils and other organizations.
- b. Improve grades and standards.
- c. Cooperation with inspection service to secure better packs.
- d. Improvement of packing house equipment, facilities and system.
- e. Mechanization of pack house operations to secure rapid and careful handling.
- f. Job simplification.
- g. Better storage operation.
- h. Development of suitable and consumer package containers.
- i. Development of new fruit products and improvement of all fruit products.
- j. Improvement of orchard and market transportation.
- k. Ways and means of better and more efficient labor utilization.
- l. Systematize orchard packing house and storage operations.

GOALS

During 1954 effort will be made to attain the following goals.

A. Meetings

1. Statewide meetings	6
2. Fruit association meetings	100
3. Fruit outlook meetings	20
4. Spraying	30
5. Orchard field meetings	20
6. To discuss rodent control	15
7. Grades, standards, and containers	8
8. Marketing	12
9. Harvesting	22
10. Orchard management	20
11. State and area marketing clinics	12

B. Schools

1. Fruit schools	12
2. Harvesting and handling	10
3. Grading and packing	10

C. Tours

1. Area tours	1
2. County tours	6

D. Demonstrations

1. Spraying

a. Method demonstrations	50
b. Result demonstrations	30

2. Pruning

a. Method demonstrations on peaches	60
b. Result demonstrations on peaches	15
c. Method demonstrations on apples	80
d. Result demonstrations on apples	30
e. Method demonstrations on cherries	5
f. Result demonstrations on cherries	2
g. Method demonstrations on plums	12

3. Thinning

a. Brush thinning method on peaches	10
b. Hose thinning method on peaches	20
c. Hand thinning method on peaches	5
d. Chemical thinning method on peaches	10
e. Result brush thinning on peaches	5
f. Result hose thinning on peaches	5
g. Result chemical thinning on peaches	8
h. Method demonstrations, chemical sprays on apples	25
i. Result demonstrations, chemical sprays on apples	20

4. Rodent Control

a. Method demonstrations with poison baits	15
b. Result demonstrations with poison sprays	10

5. Pollination

a. Result demonstrations	10
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6. Handling, grading, and packing

a. Method demonstrations on peaches	10
b. Method demonstrations on apples	35

7. Orchard management

a. Method demonstrations on applying fertilizers	20
b. Result demonstrations on applying fertilizers	30
c. Method demonstrations on managing cover crop on peaches	20
d. Result demonstrations on fertilizing peaches	10
e. Result demonstrations with soil conditioners	5
f. Planting demonstrations	15

E. Publicity

1. Spray bulletin	1
2. Spray notices	19
3. Pre-harvest circular	1
4. Rodent control circulars	2
5. Peach tree borer circular	1
6. Fruit handling circular	1
7. Pruning circular	1
8. Radio talks	32
9. Television programs	8
10. Magazine and press	80
11. Slides, movies and other visual aids	50

F. Agency Cooperation

1. Virginia State Horticultural Society
2. Virginia State Apple Commission
3. County planning committees
4. County agricultural committees
5. Plant pathologists
6. Entomologists
7. Agricultural engineers
8. Soil Conservation Service
9. National Apple Institute
10. National Peach Council
11. U. S. Department of Agriculture
12. State Department of Agriculture
13. Processors
14. Storages
15. Agricultural Economics Department
16. All other organized groups and agencies

SMALL FRUITS

The 1953 small fruit production picture in Virginia appeared to be nearly consistent with the overall berry crop acreage in 1952 in spite of the decreasing strawberry acreage. Expansion of grapes, raspberry, and blueberry plantings nearly offset the shrinking acreage (4500 to 4200 acres) devoted to strawberries. This continued reduction in strawberry acreage

can be traced back to the highly unsatisfactory prices for the 1952 crop. Unsatisfactory prices received that year were due in no small part to the dry weather which reduced yield as well as quality. This plus the heavy carryover of the 1951 crop resulted in very poor prices for offerings. Growers received much better prices for the 1953 crop, and the outlook seems to be for maintaining present acreage for the 1954 harvest with a strong possibility of a turn about and a real increase in spring plantings of strawberries. Some increase in acreage has already been noted as a result of experiments that have been carried out at the Virginia Truck Experiment Station, resulting in new strawberry varieties and a change in practice of setting plants in February and March to November with a subsequent harvest of a crop of berries the following May. This points towards extensive savings in the cost of production and might result in Virginia's strawberry acreage increasing substantially. Most encouraging in the overall picture is the fact that this coming spring nurserymen will be offering eastern growers planting stock of virus-free plants of some of the principle varieties such as Blakemore, Sparkle, Catskill, Howard 17, Tennessee Beauty, and Klondike. Thus, it is safe to conclude that in Virginia and over the country as a whole in spite of the reduction in acreage a larger overall crop should be harvested due to the advent of virus-free planting stock.

Raspberry production seems to be holding its own, with new plantings being set out offsetting the older ones that are passing out of the picture. The marketing opportunities for this berry crop are holding up exceptionally strong, both for the fresh market, and especially with processors who are making jams, jellies, and ice cream mixes. Concerns who are freezing raspberries have also been scrambling around in an attempt to acquire their pre-requisites. One direct result of this scarcity is the fact that Virginia

processing concerns are now going to the expense of underwriting the procurement of raspberry plants for 4-H raspberry projects as well as scattered commercial projects for this coming year in the northern and western sections of Virginia. One of the major problems that can be seen that might prevent any large plantings is the extreme scarcity of good raspberry tips due to the combination of drought conditions of this past year and the scarcity of labor at the time when raspberry tips should have been put down.

The crops from Virginia's vineyards are still relegated to third position in the overall small fruit picture and are fast closing the gap from strawberries. This is directly due to a number of new commercial vineyards that were set out last spring and the continued expansion of a number of other commercial plantings that are being carried out as cooperative extension activities. This trend of increased grape plantings should continue, especially where the fresh marketing possibilities are found to be very good. Virginia eastern bunch grapes found good acceptance in some of the larger city markets such as Washington, Baltimore, and Philadelphia. This will go a long way towards encouraging additional plantings this coming spring.

Plantings of blueberries, dewberries, and blackberries can be made on a limited commercial scale, with the largest increase of these small fruits being primarily centered about result demonstrations carried out in cooperation with extension personnel. For the most part these crops are being in eastern Virginia and over on the eastern shore where weather and soil conditions appear to be more naturally suited to the pre-requisite. Some blueberry and blackberry plantings have been established on the fringes of population centers in other sections of the state. Most of these specialty small fruit growers are successful in full harvesting and marketing, and this is especially true v

growers who are irrigating. This fact leads most of us who are interested in the promotion of these crops to feel that one day they will take their place in the fruit growing picture of the state. All three of these crops, blueberries, blackberries, and dewberries, are especially suited for freezing. With the advent each year of a great need for these berries by frozen food concerns as well as the homemaker, there continues to be an increasing interest in the culture of these crops. This seems to be especially true of blueberries as people become better acquainted with the requirements for growing this crop. It is now recognized that blueberries thrive under widely differing conditions so long as basic requirements of acidity, well drained sites, and uniform moisture supply are available.

The liberty of inserting a few lines concerning nut crops is not to confuse the reader in thinking that they should be considered small fruit crops. It is more that important work has been carried out with nuts, and additional time and energy will continue to be spent in the promotion of same. Nut crops as yet do not constitute an important commercial crop here in the state. However, there is considerable interest in many quarters as to future possibilities of nuts in diversified specialty income crops. This is especially true as new and more suitable varieties are introduced into the state. Trial plantings of filberts, pecans, Chinese chestnuts, and black walnuts have been distributed to farmers in various sections of the state since 1949. A sufficient number of these plantings have made good vigorous growth, and there is some reason for enthusiasm as to the future possibilities of some of the varieties that are being tested. It is hoped that sixteen additional plantings will be set out with Virginia farmers in 1954.

Major Problems:

1. Need for new and adaptable disease resistant small fruit varieties.
2. Adequate sources of disease-free small fruit stock.

3. The need for additional small fruit processing concerns.
4. A greater interest on the county level in promoting small fruit production.
5. Research in labor saving methods, especially chemical weed control for grapes, brambles, and strawberries.
6. Cheaper and more adequate irrigation equipment for small fruit plantings.
7. Commercial small fruit acreage trials scattered in certain sections of the state.
8. Research as to cultural practices for small fruits involving varietal trials, spacing, fertilization, uses of mulches, irrigation, and chemical weed control.

Active Goals

1954 Goals

Agent Training Meetings	50
Project Meetings	30
Leader Training Meetings	20
Planting Demonstrations	15
Veterans Class Meetings	30
Community Club Meetings	15
General Meetings	20
News Stories	35
Radio and TV Broadcasts	35

Result Goals

Number of Growers to Plant Adapted Varieties	3,000
Number to Improve Cultural Practices	2,500
Number to Use Fertilizers	1,500
Number to Control Disease and Insect Pests	1,500

Methods of Procedure

1. Press, Radio, and Television

Optimum use will be made of the facilities of the press, radio, and television in order to reach as many present and potential fruit growers as possible with pertinent information. These avenues of approach are both very important and necessary in view of reaching the one hundred counties of Virginia with timely fruit growing suggestions.

2. Agent Training Conferences

Conferences with County and Home Agents will be held whenever it is deemed advisable in order to acquaint the county personnel with the growing and marketing possibilities for the majority of the small fruit crops. These

conferences more often than not will be held in conjunction with meetings and demonstrations and project visits that are being held in the county from time to time. The launching of a more vigorous 4-H series of projects will also enhance the possibility for agent training conferences. It is an accepted fact that it is vitally important to enlist the agent's interest and time in order to launch successful new crop planting projects.

3. Meetings

Leader training, veterans, 4-H club, community, and countywide meetings are still some of our best avenues of approach to a large number of present and potential growers of small fruit crops. These meetings prove of additional benefit in the training of the county personnel as well as supplying cooperators for important projects and trial plantings.

4. Demonstrations

The well worn slogan, "seeing is believing," is very applicable to launching both new fruit plantings in areas where they are needed as well as to make the many additional cultural improvements to present commercial and home plantings. In fact, it appears to be the one certain way in which small fruit programs can be launched in certain counties which are slow in setting out needed berry crops.

5. 4-H Club Projects

4-H Club projects have been an increasingly important phase of my overall approach to good small fruit production, and this year the club projects appear to be coming in for a lion's share of time. Sponsors have been made available for 4-H projects in areas where both commercial and additional home plantings of berry crops need expanding. These 4-H projects will be supported by considerable publicity which is hoped to stimulate a number of our small farm owners to exploit the possibilities of small fruit plantings as part of their overall farm plan.

6. Visual Aids

Additions will be made to Kodachrome slide sets for blueberry, raspberry strawberry, and grape culture. Photography using black and white showing phases in the cultural program will be carried out and the resulting pictures enlarged so they might be used in discussions in our various meetings and demonstrations.

Respectfully submitted,

A. H. Teske
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Horticulturist