

ANNUAL REPORT

1960

Fruit and Vegetable Processing and By-Products
Department of Horticulture
Extension Division
Virginia Polytechnic Institute
Blacksburg, Virginia

By

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Table of Contents

Index to Tables.	A
Index to Figures and Illustrations	B
Commercial Canning	1
Variety Testing--An Extension Research Approach	3
Commodity Meetings, Demonstrations, and Field Days.	4
Drosophila Control in Tomatoes for Canning and in Canned Tomatoes	7
Institutional Canning.	12
Miscellaneous Activities	13
Meetings Attended.	14
Conclusions.	15
Statistics	16

Index to Tables

Table 1A

A Progress Report, Yield and Chemical Analysis of Sweet Potato Varieties.
Page 18.

Table 1B

A Progress Report, Processing Qualities of Ten Replicated Sweet Potato
Varieties. Page 19.

Table 1C

A Progress Report, Processing Qualities of Six Observational Sweet
Potato Varieties. Page 20.

Table 2

Drosophila Control, Picked Fruit Treated at Loading Row--0.1 Percent
Pyrethrum Dust. Page 21.

Table 3

Drosophila Control, Picked Fruit Treated at Loading Row--Two Pyrethrum
Dusts. Page 22.

Table 4

Drosophila Control, Hand Puff Versus Hand Rotary Field Application of
Pyrethrum Dusts. Page 23.

Table 5

Drosophila Control, Time of Application--0.1 Percent Pyrethrum Dust.
Page 24.

Table 6

Drosophila Control, Loads Treated at Plant--Liquid Versus Dust Pyrethrum.
Page 25.

Table 7

Drosophila Control, High Pressure Application--Three Field Sprays. Page 26.

Index to Figures and Illustrations

Figure 1

Typical Raw Product Display at Sweet Potato Field Day.
Page 5.

Figure 2

Typical Canned Product Display at Sweet Potato Field Day.
Page 6.

Figure 3

Tomato Treatment Shed at Cannery, Drosophila Control.
Page 11.

* * *

Illustration 1

Notice of Sweet Potato Field Day on Eastern Shore.
Page 27.

Illustration 2

THE VIRGINIA PROCESSOR, Volume 2, Number 5, November, 1960.
Page 28.

ANNUAL REPORT FOR 1960

The Fruit and Vegetable Processing and By-Products Project of the Virginia Agricultural Extension Service can be divided into four main fields of endeavor. These are commercial canning, commercial freezing, locker plant operations, and institutional canning. Major emphasis during 1960 was placed on commercial canning with particular attention to vegetable processing.

During the period of this report, the work in this project was carried on by Littleton W. Johnson, Assistant Extension Food Technologist, who devoted 75 percent of his time to the project. The plan of work for 1960 was followed as closely as possible, although it was found necessary to shift emphasis in some of the work due to specific requests from some canning groups.

Commercial Canning

The first three months of 1960 served as an organizational period for work with various commodity groups around the state. During this period, assistance was given to Experiment Station personnel in evaluating the research program relative to apple processing being conducted by V. P. I. Considerable time was also spent in preparing budgetary requests for a pilot fruit and vegetable processing laboratory which was submitted in the over-all V. P. I. request for funds in the governor's budget.

Following the apple processing and harvest season, meetings were held with sweet potato processors and growers, where requests were introduced for specific research on the suitability of different varieties for processing to accompany the existing fresh market evaluation of such roots. Expansion of the sweet potato variety testing project resulted, and other work relative to the canning quality of sweet potatoes was inaugurated. Requests from the Tri-State Packers' Association, of which Eastern Shore canners are members, resulted in evaluations of the influence of syrup concentrations on the wholeness and palatability of canned sweet potatoes being undertaken.

Tomato processors also made requests for variety evaluation work, with more emphasis upon can yield per basket of ripe tomatoes. Following this request, the tomato variety evaluation work was expanded to include more of the processing qualities exhibited by the varieties being tested. Further requests were forthcoming from whole tomato processors of the Northern Neck to evaluate their place in the market and to investigate what measures might allow them to secure a more enviable position in the marketing of canned tomatoes. Cooperative work with the Virginia Department of Agriculture, Division of Markets was thus begun in the promotion of quality in the canned tomato pack as a means of promotion of the Virginia product.

Eastern tomato growers and canners, having experienced severe losses during the previous year due to drosophila infestations, followed with requests for continued investigations on control measures to combat this menace. An extensive research approach was undertaken on control measures for suppressing drosophila activity in tomatoes for canning and demonstration work was done to aid canners in this endeavor.

Numerous plant visits were made in coordinating tomato variety canning under the variety test program and also drosophila control in tomatoes for canning, both of which were executed in commercial plants of cooperating canners. As the season progressed into sweet potatoes, again much of the actual canning of the test varieties was done in commercial plants of cooperating canners. Such an approach allowed the extension specialist to give on-the-spot demonstrations of good canning techniques to participating canners. Another facet of this approach from an extension viewpoint was the publicity attributed to the work via the canners' grapevine, and which resulted in specific requests for evaluation visits from heretofore, luke warm clientele. A result of this work, combination research and extension done in participating processing plants, by the extension specialist has been the general increase in awareness

on the part of Virginia tomato and sweet potato canners for more attention to quality and efficiency of operation.

In addition to the research-extension program carried out by the extension specialist, numerous plant service calls were made during the year on specific problems which ranged from working out how to prevent preserved strawberries from floating to the top in preserves, to tracing the cause of darkening in canned sweet potatoes. With this introduction, specific areas of emphasis will be considered in more detail under the appropriate headings in this annual report.

Variety Testing--An Extension Research Approach

While the variety testing program is the responsibility of the Experiment Station, the extension specialist has integrated the processing aspects of this project into his joint research--extension responsibility. For the past several years, a program has been carried on to test various fruit and vegetable varieties for production under Virginia conditions, and more or less incidentally for processing use. This work has primarily been centered on tomatoes and peaches, although other items were evaluated from time to time. Since it was pointed out by the extension specialist and more forcefully so at canners' meetings, that raw product quality is affecting both sweet potato and tomato canners to the extent where they may cease to exist in a competitive market and thus deprive Virginia growers of a market outlet, a new program was begun in 1959 and continued in 1960 to evaluate varieties more extensively for their canning characteristics. This program was expanded to include processing trials on tomatoes in the Northern Neck and on the Eastern Shore, and was tied into the quality program promoted by the Historyland Tomato Packers' Co-Op of the Northern Neck. To service sweet potato growers and canners, a variety test program was inaugurated in 1959 and continued in 1960 on the Eastern Shore, which is the principal sweet potato area of the state.

Results of these tests, both tomato and sweet potato are made available to canners and growers alike in the form of progress reports. It will, of course, be necessary to evaluate varieties over a period of two to three years to arrive at concrete recommendations. Summaries of sweet potato varieties tested on the Eastern Shore in 1960 are given in Table 1; and will serve as an example of the type of information that is made available each year to growers and processors through this variety test program.

Commodity Meetings, Demonstrations, and Field Days

In conjunction with the variety testing program, field days at which demonstrations were given of the work being conducted were held at the local substations where the test work was actually performed. In the Northern Neck canners were invited in to watch the harvesting and grading of the experimental tomato varieties from the actual test plots. Later these graded tomatoes were transported to various commercial plants where they were canned. Actual demonstrations of canning techniques were thus given and fine points such as the use of salt tablets to increase firmness, and influence of raw product upon the canned pack were exploited. This phase of the work was available to any interested tomato canner and was tied back to the Historyland Packers effort toward a higher quality pack. On the Eastern Shore, similar techniques were employed in actually canning the experimental tomato varieties in commercial processing plants.

Six commodity meetings were held on tomatoes in counties in Virginia producing tomatoes. Coordination of the programs with vegetable production workers resulted in coverage of topics beginning with tomato plant production and ending with consideration of the processed product. At each of these meetings canned samples of the tomato varieties being tested were displayed. A measure of the effectiveness of this approach has been suggested through the tremendous change that took place in the tomato variety planted for

cannery markets. In 1958 the principal tomato variety grown in Virginia for both fresh and canning use was Rutgers. In 1959 and 1960, based on research data developed through the variety testing program, approximately 80 percent of the canning tomato acreage in Virginia was planted to the Campbell 146 variety.

The sweet potato variety test program permitted a field day held on the Eastern Shore of Virginia, to which the public was invited. Over 100 people, consisting of growers and processors, were present to see field demonstrations of each variety turned out of the ground, canned product displays of the same roots, and to hear discussions on seed stock selection, disease control, and quality requirements of processors by specialists in each of these fields. This field day was coordinated through the county agent's office of sweet potato producing counties and notices were circulated as shown in Illustration 1. Pictures of the field day follow to show how this program was conducted.



Figure 1. Typical Raw Product Display



Figure 2. Typical Canned Product Display

In addition to the sweet potato field day held on the Eastern Shore, the extension processing specialist was invited to appear at the Tri-State Packers' annual convention in Baltimore, Maryland, to discuss and display samples of the sweet potato varieties tested in Virginia. The Tri-State Packers' Association is a canners' organization that embraces canners in Maryland, Delaware, New Jersey, and the Eastern Shore of Virginia. At this meeting an interchange of varietal evaluations from other states assists Virginia canners to evaluate results obtained in the Virginia tests, and extends the information developed to adjacent sweet potato processing states.

Over and above the actual testing of sweet potato varieties for suitable processing characters, the actual canning in the variety test program is conducted cooperatively in various commercial processing plants. Actual demonstrations of canning techniques are thus given and fine points such as pre-heating to prevent discoloration are exploited. The combined approach, gather-

ing new ideas at the Tri-State Packers' Association meeting and the actual testing of these ideas in commercial plants, has resulted in an extension teaching approach which helps sweet potato processors in Virginia to keep abreast of new ideas as they are developed. This approach has done much to emphasize quality consideration by sweet potato canners and to get them to adopt new practices as they are suggested. A measure of the effectiveness of this approach has been the increased concern of sweet potato growers to produce varieties suitable for the processor who now uses over 50 percent of the total crop.

Drosophila Control in Tomatoes for Canning and in Canned Tomatoes

The control of drosophila (vinegar gnats) is of increasing concern to the canners of tomatoes and other farm products in Virginia. In 1959, state and federal food law enforcement agencies seized and confiscated several large lots of canned tomatoes because of contamination due to drosophila eggs and larvae found in the canned product.

The little yellow-ship flies freely lay their eggs in fresh cracks and breaks in ripe tomatoes. These eggs, which are so small they are usually not noticed, are white and long and narrow. They hatch in a day or so into tiny cream-white larvae which grow rapidly and mature in about four days; after a few days more the adult fly emerges and shortly starts producing the next generation. Because of their short life cycle, 8 days or less with optimum conditions, and their ability to multiply at a rapid rate, the insects can increase to fantastic numbers in a very short time. Individual females may lay as many as 2,000 eggs. All they need is access to an abundance of suitable material in which to breed and conditions that are otherwise favorable.

Previous work has shown that control measures must be practiced both in the field and at the processing plant to be effective in suppressing drosophila activity. In Virginia most tomatoes are produced for processing without contracts and field controls, and are not under processors jurisdiction until they

are delivered to the plant. With this fact complicating the control picture, the extension specialist was called in by the Eastern Virginia tomato canning industry in 1959 to initiate work that would help reduce the incidence of drosophila infestation in tomato fields and contamination of the canned product. The specific problem with which processors were faced was how to control the quality of the raw stock with respect to drosophila contamination since it determines to a great degree whether or not the final pack will be condemned by food law enforcement agencies.

In 1959 the cooperation of two tomato growers and two canners was secured and the work on drosophila control in tomatoes for canning was begun. Applications of insecticides in replicated fields, using in-plant controls and following each experimental batch of tomatoes through the entire field to plant and through the plant cycle was carried out. Numerous suggestions helpful in control were made after following the cycle mentioned above through the entire 1959 season, although fully satisfactory control was not developed. For example, based on the evidence of one year's work, it was seen that recommendations made by the manufacturer of the insecticide, Diazinon, that weekly applications be begun when flies start to appear in the field and repeated at about weekly intervals for the remainder of the canning season, was not sufficient to give acceptable control under Virginia conditions. Other factors uncovered were related to cultural practices. Keeping weeds and grass to a minimum was apparently instrumental in keeping adult fly populations down to some extent when insecticides were used, because of the shading and protection that was afforded. Spacing of rows was found to be important so that crushing of fruit by picking and other operations could be reduced and thus reduce breeding. The growth cracks prevalent in Virginia grown tomatoes were pointed out as undesirable and likely places for the laying of eggs.

In 1960 an expansion of the preliminary investigations begun the previous

year was undertaken. An all out effort was made to evaluate: 1) field control through spraying with several insecticides, 2) protection of the harvested fruit in the field and en route to the cannery, 3) protection of the harvested fruit while at the cannery and prior to processing, 4) methods of applying insecticides to harvested fruit, 5) the time insecticides should be applied to harvested fruit, and 6) the most effective formulation of the only cleared material (pyrethrum) to use on harvested tomatoes.

Results of the study conducted in 1960 on drosophila control in canning tomatoes are shown in Tables 2 through 7. The conclusions reached following statistical analysis of the data gathered in this study were:

1. There is a significant protective effect at the 1 percent level of pyrethrum dusts on harvested tomatoes over untreated fruit.
2. The protection or ability to repel fruit flies from harvested tomatoes afforded by pyrethrum dusts under Eastern Virginia conditions is not longer than 6 hours instead of 24 hours as suggested by the National Cannery Association, pyrethrum manufacturers and experiment stations of other universities.
3. The pyrethrum formulation which is synergized with piperonyl butoxide in a 1 part pyrethrum to a 10 part synergist provides greater protection to harvested tomatoes from drosophila invasion than do straight pyrethrum dusts.
4. Pyrethrum dusts should be applied to harvested tomatoes at the rate of 1/2 pound per ton of harvested fruit as soon as they are picked. Each tier should be dusted as they are loaded on the truck in the field.
5. Pyrethrum dusts are most effectively applied with rotary hand dusters in the field and with power knapsack dusters at the cannery.
6. Pyrethrum dusts are superior to liquid pyrethrum formulations applied as fogs.
7. The application of field sprays for drosophila control in canning tomatoes seems questionable from the costs involved as weighed against the

measure of protection afforded. When the three most promising materials, as determined by research in other states, were evaluated under Virginia conditions, Aldrin at the rate of 1/2 pound actual per acre applied 1 day before harvest gave the best results in the 1960 tests.

Two approaches were actually taken with respect to drosophila control in harvested tomatoes. The first approach was to develop data and this has been discussed. The second facet of the problem was to persuade canners and growers to adopt the recommended practices suggested by the study as the data was developed during the season. This speedy adoption approach was necessary to prevent seizures of the canned product similar to those experienced by canners during the 1959 season. With the dual objectives suggested through experience with the drosophila situation in 1959, the demonstration of dusting equipment to tomato canners throughout the state was undertaken before the actual gathering of data and testing of both equipment and techniques took place. The objectives sought in these demonstrations were to familiarize canners with equipment available to them, to provide them with cost figures for the equipment, and to allow them to pre-plan for modifications in their procurement procedures, should the research show positive results as the season progressed.

Favorable, not absolute, control was achieved with pyrethrum dusts of the proper formulation as cited previously. This finding resulted in close coordination between growers and canners to treat tomatoes in the manner being investigated for drosophila control. Growers dusted in the fields with pyrethrum as the tomatoes were harvested and canners treated the loads of fruit upon delivery to the cannery. Treatment sheds with end flaps that could be covered similarly to that shown in Figure 3 were constructed by Eastern Shore canners, and loads of harvested tomatoes were dusted upon arrival at the cannery. No seizures of canned tomatoes were reported for the Eastern Shore during the 1960 season.

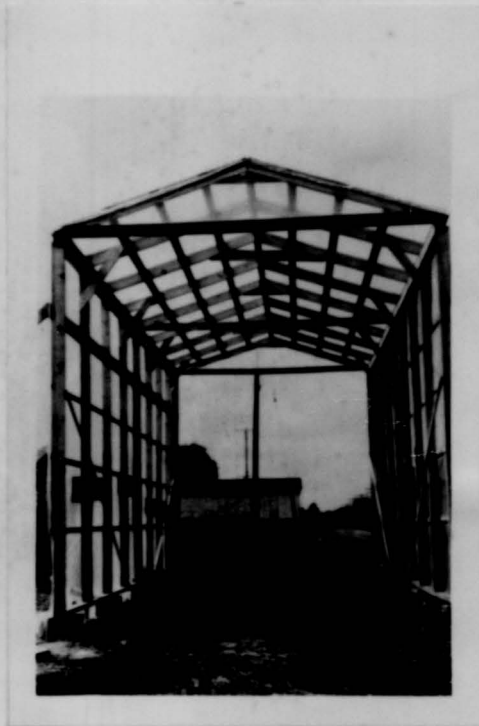


Figure 3. Tomato Treatment Shed at Cannery

With the threat of possible canned product seizure because of insect egg and larvae contamination by both state and federal agencies, the extension specialist inaugurated a campaign among tomato canners for individual quality control laboratories. Three small canners were receptive to this suggestion and aid was given them in procuring the necessary equipment to perform mold counts and insect fragment analyses. The extension specialist personally trained the laboratory analyst for each of the quality control labs, and it is thought that more tomato canners will solicit help of this nature in the

coming season. There are two reasons why tomato canners now feel a quality control lab is important. First, it is less expensive for them to perform their own analyses than to pay consulting labs for this service, and secondly, the drosophila threat has made it mandatory for them to know the control realized in treating for such contamination with the threat of seizure hanging in the balance.

Institutional Canning

As in the past, the Department of Welfare and Institutions requested assistance with the institutional canning program at the various prison farms. These farms can and freeze a considerable part of their food supply and seem very anxious to improve the over-all quality of their program.

These institutions were visited at their request, and discussions were held with the supervisory personnel relative to their food processing problems. A considerable part of the discussions centered around equipment necessary for handling the various items and the processes used to can or freeze them. Samples of their canned foods were opened in some of the institutions in order to check the quality of the pack and recommendations for improving them were discussed.

A considerable change can be seen in these institutional canneries from the condition they were reportedly in several years ago. New housing facilities and also canneries, are being permanently constructed throughout the state. During 1960, the extension specialist assisted the Farm Coordinator of the Department of Welfare and Institutions to readjust canning operations in the various canneries to those commodities which each institution was able to produce. This rescheduling of canning in the area in which a commodity is produced has done much to eliminate inefficiencies due to transportation of the raw produce and storage of the canned product. Such a program has led to the intensified training of cannery operators in the canning of specific commodities.

and a resulting increase in quality of the canned goods produced. Apparently these institutions have been very receptive to the help given them in the past, and their food processing program seems to be improving and growing.

Miscellaneous Activities

Various activities were tied in with the program of the Department of Horticulture and the Department of Agricultural Economics.

Each fall, the Student Horticultural Club sponsors a show on the Virginia Polytechnic Institute campus and the various staff members assist in the erection of exhibits for this show. During the last show, the extension processing specialist again assisted in setting up an exhibit for this affair.

In cooperation with the Department of Agricultural Economics, the extension specialist edits a bimonthly news circular entitled THE VIRGINIA PROCESSOR, see Illustration 2. The aim of this publication is to keep Virginia processors informed of progress in research being conducted at V. P. I. and to keep them abreast of current happenings related to processing. The present circulation includes 97 county agents; 74 processors; 58 technical people associated with various research stations, suppliers of the processing industry, etc.; and 57 V. P. I. staff members.

To implement the speedy adoption of dust treatments of canning tomatoes for drosophila control, the preparation of an extension bulletin treating this subject is now underway. This bulletin, and a 7 1/2 minute film produced in 1959 entitled HOW TO PICK CANNING TOMATOES, which has been reworked, will form a core of material for county agents to use in conducting meetings related to treating tomatoes for canner use.

In an effort to reach home processors, a total of eleven radio tapes was prepared for use around the state at various local stations. This program is followed each year for presenting timely hints on home canning and freezing. This year the radio tapes have emphasized frozen foods, preparation, handling,

storage, defrosting, and serving.

Other activities during 1960 have included:

1. Serving as instructor for Communications Training School for county extension workers in east central district.
2. Assisting the secretary of the Virginia Cannery Association in planning the program for the annual meeting.
3. Assisting the secretary of the Tri-State Packers' Association in arranging for speakers for the program of the annual meeting.
4. Developing a recipe for the manufacture of strawberry preserves.
5. Investigating methods for peeling citrons for preserves manufacture.
6. Preparing specifications and meeting with suppliers of pilot laboratory equipment for processing line at college.
7. Bimonthly publication of THE VIRGINIA PROCESSOR, a canning information circular.

Meetings Attended

1. Tomato Commodity Groups in the following Counties:
 - a. Westmoreland
 - b. Richmond
 - c. Northumberland
 - d. Patrick
 - e. Caroline
2. Northampton--Accomac Sweet Potato Improvement Association Meeting.
3. President of the Virginia Cannery Association.
4. Farm Coordinator, Department of Welfare and Institutions, Richmond.
5. Tri-State Packers' Association, Baltimore, Maryland. Annual meeting.
6. Virginia Cannery Association, Richmond. Annual meeting.
7. Virginia State Horticultural Society Meeting, Roanoke. Annual meeting.
8. Superintendent of Eastern Virginia Experiment Station.

9. Director of Eastern Shore Substation, Painter.
10. Institute of Food Technologists, San Francisco, California.
11. State Food Inspection Officials, Richmond. Annual meeting.
12. Director of Virginia Truck Experiment Station, Norfolk.
13. Head, Market Expansion Section of Division of Markets, Virginia Department of Agriculture, Richmond.

Extension meetings and/or schools attended were as follows:

1. Extension Outlook Conference.
2. Frozen Food Workshop for Extension Food Technologists, Knoxville, Tennessee.
3. Annual Extension Conference.
4. Communications Training School.
5. Extension Staff Conferences.
6. Annual Experiment Station Conference.

Conclusions

Major emphasis of the Fruit and Vegetable Processing and By-Products project for 1960 was concerned with tomatoes and sweet potatoes. The tomato industry was made aware of quality as influenced by variety and an 80 percent change in the variety planted and harvested for processing was affected. Substantial advances were made in the area of quality control with tomato canners through the development of control measures for the suppression of drosophila infestations. Treatment techniques at the grower and processor level were introduced to the industry, and three processors were assisted in setting up their own quality control laboratories for insect fragment examination in conjunction with the drosophila control program. The tomato industry was made aware of the importance of certain sanitary practices, and the groundwork was laid for extending a program on drosophila suppression and quality control for canning tomatoes.

In the sweet potato canning industry, variety evaluation work was continued

to screen selections for canning before they are planted in Virginia. More emphasis was placed on quality of packs through comparisons with varieties which retain their shape, were more firm, and more symmetrical. Samples of the varieties tested were displayed at field days and canners' conventions. Test cannings by some processors have been made of certain varieties based on the results of this sweet potato variety evaluation program.

County agents have indicated a need for and a willingness to cooperate in disseminating information to canners in their respective counties. Many county agents feel they do not have the background which would enable them to work on a food technology program in their counties to the same extent they do in other areas. For this reason, it has been necessary for the food processing specialist to work closer with individuals in the industry, however, county agents are aware of problems in the industry as reflected in their particular counties, and have been most helpful in promoting the over-all extension processing program.

Statistics

Circulars prepared (individual issues)	6
Conferences with individual agents	11
Talks presented to groups	14
Professional meetings attended	4
Extension meetings attended	5
Plant visits	130
Demonstrations, field days, etc.	8
Radio tapes prepared	6
Field days	124
Office days	189

* * *

Assistance--Head, Department of Horticulture

Field days 3

Miles traveled 810

* * *

Table 1A

SUMMARY EVALUATION OF SWEET POTATOES IN 1960 TRIALS AT PAINTER, VIRGINIA

L. W. Johnson and F. H. Scott, V. P. I., Blacksburg, Virginia
E. M. Dunton, Jr., V.A.T.E.S., Painter, Virginia

Variety	Fresh				Canned	
	Total Yield per Acre U. S. 1, U. S. 2 Canning U. S. 1	Chemical Analysis			Yield of Canning U. S. 1's per Acre	Average of Syrup and Vacuum Packs Weighted Over-All Score
		Mg. Carotene per 100 g. (Dry Basis)	Percent Moisture	Percent Dry Matter		
	55 lb. Bu.				55 lb. Bu.	
L8-64*						8.6
L1-80	529	48.17	72.60	27.40	206	7.9
L3-64*						7.9
Centennial	616	43.16	73.68	25.32	180	7.7
B-6716*						7.5
Nugget (N. C. 171)	706	44.56	73.79	26.21	176	7.3
B-6521*						7.3
Oklamar	487	39.11	76.91	23.09	102	7.2
Copperskin Goldrush	638	39.11	75.38	24.62	187	7.0
Nemagold	651	27.25	73.54	26.46	238	6.7
L4-89*						6.6
Carogold	609	20.49	71.55	28.45	307	6.5
Kandee*						6.4
Allgold	462	36.78	74.25	25.75	171	6.3
Jersey Orange	562	18.86	74.66	25.34	224	6.0
Porto Rico 109	551	19.68	69.57	30.43	142	5.3

* Not in replicated plots, observational plantings only.

U. S. 1's or better: diameter (minimum 1 3/4", maximum 3 3/4"); length (minimum 3", maximum 10"). Not over 20 ounces in weight.

U. S. 2's: diameter (minimum 1 1/2"). Not over 36 ounces in weight.

Canning U. S. 1's: diameter (minimum 1", maximum 2 1/4"); length (minimum 2", maximum 7").

Table 1B

REPLICATED SWEET POTATO PLANTINGS--1960

Syrup Pack

Variety	Color		Whole- ness	Firm- ness	Tex- ture	Flavor	Weighted Over-All Score
	Hue	Uni form- ity					
Centennial	9.1	8.6	9.5	6.5	7.3	7.4	8.3
L1-80	8.9	9.0	7.2	5.1	8.7	7.8	7.7
Nugget (N. C. 171)	8.6	8.2	9.0	7.3	6.7	7.6	7.6
Copperskin Goldrush	9.2	7.7	8.6	2.7	8.8	8.4	7.3
Nemagold	7.7	6.7	8.6	5.7	7.5	7.9	6.8
Oklamar	9.0	7.8	9.2	5.9	6.6	7.7	6.6
Carogold	7.1	6.9	8.5	5.2	7.8	7.5	6.6
Allgold	6.8	5.9	9.4	5.1	8.2	8.2	6.5
Jersey Orange	7.0	6.9	5.2	4.6	7.8	7.5	5.9
Porto Rico 109	5.8	3.5	8.1	5.1	7.4	8.2	5.2

Vacuum Pack

Variety	Color		Whole- ness	Firm- ness	Tex- ture	Flavor	Weighted Over-All Score
	Hue	Uni form- ity					
L1-80	8.9	9.0	6.8	6.9	9.2	8.7	8.0
Oklamar	9.0	7.8	8.8	6.6	8.4	8.1	7.8
Centennial	9.1	8.6	6.7	6.2	7.3	6.3	7.2
Nugget (N. C. 171)	8.6	8.2	7.0	7.0	6.3	5.0	7.0
Copperskin Goldrush	9.2	7.7	6.1	3.6	8.6	7.6	6.7
Nemagold	7.7	6.7	7.6	6.2	7.1	6.7	6.5
Carogold	7.1	6.9	6.8	6.4	7.0	6.7	6.4
Allgold	6.8	5.9	7.6	6.0	8.1	6.3	6.2
Jersey Orange	7.0	6.9	5.6	5.3	7.5	6.5	6.0
Porto Rico 109	5.8	3.5	7.6	7.1	6.3	6.8	5.4

All varieties were processed September 30th. Pack scored by technical panel of 5 judges during 4 replications, begun November 14th.

Scoring on basis of 1 (low) to 10 (high) with weighted over-all scores below 6 indicating below commercial acceptability. Factors rated for over-all score as follows: uniformity 30, hue 20, wholeness 20, firmness 15, texture 10, and flavor 5. Hue = exterior color (range from bright orange to light yellow); wholeness = lack of cracking and/or sloughing; firmness = resistance to compression as measured by an ASCO Model 3C firmness meter using 200 grams prestress weight, 200 grams test weight, and a time of 10 seconds; texture = moistness or mouth feel and lack of stringiness.

Table 1C

OBSERVATIONAL SWEET POTATO PLANTINGS--1960

Syrup Pack

Variety	Color		Wholeness	Firmness	Texture	Flavor	Weighted Over-All Score
	Hue	Uniformity					
L8-64	9.7	9.2	9.6	5.5	8.9	7.8	8.7
L3-64	8.2	7.6	9.8	7.8	8.4	8.1	8.3
B-6716	7.7	8.0	9.0	7.4	7.9	8.4	8.1
B-6521	8.3	7.4	7.8	6.0	8.2	8.4	7.6
L4-89	6.8	5.3	8.2	7.3	8.0	8.0	6.9
Kandee	6.3	5.0	8.9	7.7	6.7	7.4	6.7

Vacuum Pack

Variety	Color		Wholeness	Firmness	Texture	Flavor	Weighted Over-All Score
	Hue	Uniformity					
L8-64	9.7	9.2	8.3	5.6	8.7	7.3	8.4
L3-64	8.2	7.6	7.8	6.8	6.9	5.6	7.4
B-6716	7.7	8.0	5.8	6.1	7.5	5.7	7.0
B-6521	8.3	7.4	6.5	5.2	6.8	6.9	7.0
L4-89	6.7	5.3	6.7	7.1	7.4	6.2	6.4
Kandee	6.3	5.0	6.3	7.3	6.2	5.4	6.0

Table 2

PICKED FRUIT TREATED AT LOADING ROW--0.1 PERCENT PYRETHRUM DUST

Hours from Treatment	Fruit Location in 5/8 Bushel	Mean Egg Count per Slit Fruit (Average of 16 Observations)	
		Check	0.1% Dust
6*	Top	26.43	1.44
	Middle	17.81	1.25
	Bottom	0.00*	0.63
Average for 5/8 Bushel		14.75	1.11
12	Top	134.81	36.56
	Middle	84.75	16.69
	Bottom	52.31*	36.50
Average for 5/8 Bushel		90.62	29.92
24	Top	98.44	55.69
	Middle	89.06	54.56
	Bottom	71.25*	67.31
Average for 5/8 Bushel		86.25	59.19

* Statistical significance at the 1 percent level.

Note: Dust applied with rotary hand duster.

Table 3

PICKED FRUIT TREATED AT LOADING ROW--TWO PYRETHRUM DUSTS

Hours from Treatment	Fruit Location in 5/8 Bushel	Mean Egg Count per Slit Fruit (Average of 16 Observations)		
		Check*	0.075% Dust plus 0.75% Piperonyl Butoxide	0.11% Dust
3*	Top	155.25*	9.75	1.13
	Middle	13.50	0.75	15.56
	Bottom	13.88	1.13	5.06
Average for 5/8 Bushel		60.88	3.88	7.25
6	Top	328.13*	44.63	105.38
	Middle	48.94	6.75	9.94
	Bottom	72.56	40.69	14.81
Average for 5/8 Bushel		149.88	30.69	43.38
9	Top	296.25*	64.00	141.38
	Middle	50.63	10.13	51.37
	Bottom	49.31	1.13	6.94
Average for 5/8 Bushel		132.06	25.09	66.56

* Statistical significance at the 1 percent level.

Note: Dust applied with rotary hand duster.

Table 4

HAND PUFF VERSUS HAND ROTARY FIELD APPLICATION OF PYRETHRUM DUSTS

Hours from Treatment	Fruit Location in 5/8 Bushel	Mean Egg Count per Slit Fruit (Average of 16 Observations)					
		0.075% Dust plus 0.75% Piperonyl Butoxide		0.1% Dust		0.11% Dust*	
		Puff	Rotary	Puff	Rotary	Puff	Rotary
0*	Top	0.75*	0.00	0.00	0.00	0.00	0.00
	Middle	0.94	0.00	0.00	0.38	0.00	1.13
	Bottom	0.75	3.56	0.00	0.00	0.94	0.38
Average for 5/8 Bushel		0.81	1.19	0.00	0.13	0.31	0.50
6*	Top	0.38*	3.00	6.00	4.13	6.75	4.31
	Middle	1.13	15.56	3.00	4.50	13.31	5.44
	Bottom	4.69	6.38	5.06	11.25	34.12	2.06
Average for 5/8 Bushel		2.07	8.31	4.69	6.63	18.06	3.94
12*	Top	13.88*	9.94	21.75	12.56	28.88	12.56
	Middle	5.63	6.56	15.75	15.00	25.31	11.81
	Bottom	12.00	8.06	22.50	2.06	21.19	50.44
Average for 5/8 Bushel		10.50	8.19	20.00	9.87	25.13	24.94
18*	Top	7.88*	1.88	4.50	2.25	34.50	2.81
	Middle	22.50	4.88	28.69	12.19	33.94	7.50
	Bottom	9.94	3.75	41.63	8.81	47.25	2.06
Average for 5/8 Bushel		13.44	3.50	24.94	7.75	38.56	4.12

* Statistical significance at the 1 percent level.

Table 5

TIME OF APPLICATION--0.1 PERCENT PYRETHRUM DUST

Fruit Location in 5/8 Bushel	Mean Egg Count per Slit Fruit after 12 Hours (Average of 12 Observations)				
	Check*	Dust at Plant	Dust in Loading Row	Dust at Plant and in Loading Row	Dust as Loaded (Tier by Tier)
Top	290.75	38.58	3.25	3.75	7.50
Middle	302.75	43.25	14.25	19.50	7.75
Bottom	60.75	17.00	21.75	4.00	5.25
Average for 5/8 Bushel	218.08	32.94	13.08	9.08	6.83

* Statistical significance at the 1 percent level.

Note: Dust applied at plant with power duster; dust applied in loading row or as loaded with rotary hand duster.

Table 6

LOADS TREATED AT PLANT--LIQUID VERSUS DUST PYRETHRUM

Hours from Treatment	Fruit Location in 5/8 Bushel	Mean Egg Count per Slit Fruit (Average of 16 Observations)			
		Check*	0.4% Liquid	.177% Liquid	0.1% Dust
			plus 0.5% P.B.*	plus 1.77% P.B.	
3*	Top	7.31*	13.69	2.44	0.00
	Middle	4.88	2.81	0.00	0.00
	Bottom	3.38	0.00	0.00	0.00
Average for 5/8 Bushel		5.19	5.50	0.81	0.00
6	Top	245.63*	311.25	80.81	2.81
	Middle	44.63	65.81	12.56	0.00
	Bottom	15.75	15.38	0.94	0.00
Average for 5/8 Bushel		102.00	130.81	31.44	0.94
9	Top	375.00*	299.06	18.19	3.75
	Middle	128.25	88.31	19.31	0.56
	Bottom	104.06	13.50	6.56	1.31
Average for 5/8 Bushel		202.44	133.62	14.69	1.87

* Statistical significance at the 1 percent level.

Note: Liquid applied with Dyna-Fog Power Fogger; dust applied with power duster.

Table 7

HIGH PRESSURE APPLICATION--THREE FIELD SPRAYS

Days After Treatment	Daily Mean Egg Count per Slit Fruit (Average of 50 Observations)			
	Check*	Dibrom (1 Pound Actual per Acre)	Diazinon (1/2 Pound Actual per Acre)	Aldrin (1/2 Pound Actual per Acre)
Test I				
1	86.70	3.30	2.40	0.00
2	179.04	42.60	15.12	28.20
3	82.26	77.04	32.94	21.78
3 Day Average	116.00	40.98	16.82	16.66
Test II				
1	168.00	26.94	4.14	11.22
2	199.42	150.26	76.40	50.20
2 Day Average	183.71	88.60	40.27	30.71

*Statistical significance at the 5 percent level.

-27-

Agricultural Extension Service

66-12

Virginia Polytechnic Institute

Accomac, Virginia

October 6, 1960

Sweet Potato Meeting

TO: SWEET POTATO PRODUCERS

On Wednesday afternoon, October 12, at 1:30 p.m. you are invited to visit the Eastern Shore Sub-station at Painter to observe the V.P.I. Sweet Potato Variety Trials.

Named varieties under test this year include: Centennial (formerly identified as Lj-77), Allgold, Caragold, L-180, Copper Skin Goldrush, Jersey Orange, Nemagold, Oklahar, N.C. 171, and Porto Rico 109.

All of the above listed varieties have been processed and samples will be displayed by Littleton Johnson, Extension Food Technologist.

F. H. Scott of the V.P.I. Department of Horticulture, will discuss performance of the varieties under test.

T. J. Nugent, Plant Pathologist, Virginia Truck Experiment Station, Norfolk, will review the performance of numbered lines in the Regional breeding program.

It is hoped that you can be with us for this gathering.

Sincerely yours,

John G. Rogers

John G. Rogers
County Agent

The background is a collage of various agricultural and domestic items. At the top left is a bowl filled with small round fruits. To its right are two larger round fruits. Below the bowl is a can with a label that says "NOVEMBER 1960". In the lower left is a basket filled with round items, possibly eggs or small fruits. In the lower right is a house with a chimney. The entire collage is rendered in a sketchy, textured style.

Illustration 2

NOVEMBER 1960

the Virginia Processor

V.P.I. Agricultural Extension Service
Blacksburg, Virginia