The fruit industry in other lands. 5. The United States of America (continued)

Frank Melville

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THE UNITED STATES OF AMERICA (continued)

STONE FRUITS

THE United States grows in the vicinity of 64 million bushels of peaches, 83,000 tons of plums, 470,000 tons of prunes and 225,000 tons of apricots. About half the peaches and the major portion of the plums, prunes and apricots are grown in California which is the centre of the canning industry. There is also a large cherry industry concentrated mainly in the eastern side of the country. Production amounts to almost 100,000 tons of sweet cherries and 125,000 tons of sour varieties.

PEACH BREEDING

Peach breeding has proved very profitable in terms of the number of new varieties which have been released in recent years. These releases of both dessert and canning types have been the result of programmes in operation at many centres. This was discussed with Dr. Havis at the U.S.D.A. Plant Industry Centre at Beltsville, Maryland, where 6,000 to 8,000 seedlings from known crosses are raised each year. Of the 140,000 seedlings which have been raised over the years, 14 have proved of commercial value.

The technique adopted is as follows. The flowers are emasculated just as the petals begin to show by pinching off the anthers with the thumb and forefinger or with forceps. Emasculation is far more critical in timing than pollination and must be done at the right time even at the expense of pollination.

Prior to blossoming the whole tree is enclosed by a muslin framework to exclude insects and also provide protection to the young blossoms from adverse weather conditions. By this means setting is improved and 60-70 per cent. set can normally be obtained. The cover is retained for four to six weeks.

PEACH VARIETIES

Research has been aimed at producing varieties with improved quality and characteristics suited to growing or marketing conditions of a particular area. One important feature considered has been ability to stand mild winter conditions. A number of dessert varieties with low chilling requirements has been released and some of these could be useful under Western Australian conditions.

The following are varieties considered worthy of trial.

Maygold.
Yellow-fleshed medium-sized semi-cling. Ripens 6 six weeks ahead of Elberta. Very low chilling requirement—650 hours below 45° compared with 850 hours for Elberta.

Red Cap.
Yellow-fleshed medium-sized cling, good colour. Ripens nearly seven weeks ahead of Elberta. Low chilling requirement of 750 hours below 45°.

Coronet.
Yellow-fleshed medium-sized semi-cling but near free-stone when ripe, good colour. Ripens nearly six weeks ahead of Elberta. Very low chilling requirement of 700 hours.
Red Globe.


Two other promising varieties with low chilling requirements being planted extensively are Southland (750 hours) and July Elberta (800 hours). These have already been introduced into Western Australia. Another variety which is becoming very popular in California is Fay Elberta which is being planted in place of the standard Elberta.

One of the earliest peaches is Springtime a white-fleshed cling which ripens the equivalent of the third week in November in the southern hemisphere. It has a very low chilling requirement of 600 hours.

New canning peaches which have been released in recent years are Dixon 1 (Dix 6-6) and Dixon 2 (Dix 6-8). Both have superior quality to the general run of cling types are good producers and trees make vigorous growth. They are red centred and the red tends to diffuse into the flesh when fully ripe.

**ROOTSTOCKS**

Commercial peaches are normally propagated on seedlings such as Lovell or Elberta. Nematode resistant stocks are also available. Those seen were 2341 at Beltsville and FV 234-1 at Fresno. Both show good resistance to Meloigadyne Juvalica and incognita (acrata). S.37 is another stock with nematode resistance.

White Damson, an Institia plum, has proved useful as a stock for peaches under wet conditions.

Mariana 2624 plum stock shows resistance to Armillaria.

Plums on peach stocks appear less susceptible to Bacterial Canker.

**HERBICIDES**

Trials have shown that dalapon at the rate of 7 lb. plus Monuron at 3 lb. per acre applied in a 4 ft. square around the tree is effective against grasses. A 10 per cent. reduction in tree growth occurred when the spray was extended beyond the drip ring.

Amino triazole at 5 lb. per acre gave effective weed control without tree injury.

**SOIL FUMIGATION**

Nemagon applied at 2½ gallons per acre to peaches as a control for root knot and lesion nematodes, gave a 33 per cent. increase in growth. Trials included the use of emulsible concentrate introduced ahead of the pump into the irrigation line for distribution in the irrigation water.

**CHEMICAL THINNING**

The only material showing promise for peaches is 3 chlorophenoxy propionic acid
(3.C.P.) which is still under trial. Trials consisted of applying 100 ppm and 300 ppm at 10 days and 20 days after full bloom as respective treatments. Higher concentrations are likely to overthin. 3 C.P. has also proved effective on plums but at much lower concentrations in the region of 25 ppm. It is unsatisfactory on apricots.

MEASUREMENT OF PEACH MATURITY

Some basic work is in progress at the U.S.D.A. Plant Industry Centre at Beltsville to study methods for determining peach maturity on a commercial scale. By the use of a spectrophotometer the changes in chlorophyll and carotinoid pigments in the ripening peach is being followed with a view to accumulating data which can be used to determine standard measurements of maturity. It is hoped to build a simplified machine capable of sorting fruit into various categories based on maturity for use by the canning industry.

NEW PLUM VARIETIES

Several varieties have been released in recent years as a result of breeding work conducted at Davis by Professor Hesse. Work is also in progress at the U.S.D.A. station Fresno.

Varieties worthy of note are:

**Burmosa.**

Pink-skinned, amber-fleshed, pleasantly sweet. Ripens same time as Beauty and could provide suitable substitute. Almost free-stone. Santa Rosa or Mariposa are suitable pollinators.

**Laroda.**

Deep reddish purple, light-fleshed, large round fruit, good quality. Ripens three to four weeks after Santa Rosa.

**Nubiana.**

Deep red with light amber flesh, very firm and holds well on the tree, good quality. Ripens about four weeks after Santa Rosa.
Queen Ann.

Large dark red with amber flesh, good quality. Holds well on tree and could be stored for a considerable period. Ripens five weeks after Santa Rosa. Wickson and Santa Rosa suitable pollinators.

VIRUS INDEXING

Fundamental work on stone fruit viruses is being carried out at the Tree Fruit Station at Wenatchee. Sap transmission from living tissues using carborundum as an abrasive is the technique being used. The Chicago Pickling variety of cucumber is used for indexing for ring spot and sour cherry yellows. Physalis flaidana used for indexing apple mosaic was being tried for plum line pattern.

At Davis virus-free material of the leading cherry varieties is now available. The parent material is kept in a screen house and is only used for supplying certified buds to nurserymen to establish their own mother trees. Work is now being commenced on peaches. Initially peach cuttings are being raised under mist in a screen house to provide rootstock material. Seedlings are not used on account of certain seed-borne viruses.

HANDLING AND PACKING

Stone fruits are handled in field lugs, the packing being done either in mobile field units or in a packing shed.

Market containers vary considerably, but are normally some type of wooden tray. For instance the California peach box measures $11\frac{1}{4} \times 16\frac{1}{4}$ in. and may vary from 4 to $5\frac{1}{4}$ in. in depth. The fruit is usually packed in two layers using fancy paper cups or moulded paper fillers to separate the fruit. A light flexible unitised lid covers the box which is not completely filled. Packs are very attractive.

Plums normally go into square boxes. The special plum boxes measure $12\frac{1}{2} \times 12\frac{1}{2}$ in. and up to 7 in. deep.

Polythene lined boxes are a feature of cherry packing.

GRAPESES

COVERAGE of the grape industry of California was limited to four days and included discussions with Professor Olmo at the University of California, Davis, and in the field, visits to commercial grape packing houses and inspection of grape fumigation trials. Time did not permit a detailed examination of cultural practices.

The United States produces almost 3 million tons of grapes of which 2\frac{1}{2} million tons are grown in California on approximately 425,000 acres. Californian varieties are European types, but elsewhere they are mainly American types used for fresh and frozen juices.

California produces vast quantities of grapes for wine, in fact over half the total production goes for wine which in 1958 amounted to over 150,000,000 gallons. Raisin varieties account for about half the total area of vines in California and about 40 per cent. of the world's production. Large quantities of Thompsons Seedless go for wine and to the table grape trade. Table grape production amounts to 500,000 tons.

The various varieties of grapes tend to be concentrated in areas specially suited to the variety. This leads to a high degree of specialisation both in the growing and handling of the crop.

The San Joaquin Valley is the main centre of California grape growing and contains over 80 per cent. of the State acreage. Fresno county in the centre of the valley is the largest concentrated vineyard area for raisin and dessert wine production. Just south in Tulare county is the centre of late table grapes particularly Emperors while in the north the Lodi area is noted for its Flame Tokay.

One of the newest grape areas is the Desert of Southern California encompassing the Imperial and Coachella Valleys. Here are grown early-maturing table grapes which are marketed as from about the third week in May and bring high prices. Over 80 per cent. are Thompson Seedless but the new early selections Perlette and Delight are also becoming prominent.

Grape soils in California are mainly deep alluvial sands and loams and yields are high. The average for all types of grapes is over $5\frac{1}{2}$ tons per acre.
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This, of course, is easier said than done. Statistics show that approximately 25% of all piglets farrowed do not survive beyond weaning stage.

This tremendous mortality is largely due to poor nutrition of the brood sow and the widespread neglect of breeders to creep feed their piglets.

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<tr>
<th>SILO ERECTED</th>
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VARIETIES

The Thompsons Seedless holds first place with over 40 per cent. of the total Californian acreage and is the most versatile variety. It is grown for the early market in southern counties, is also a very important table variety in central California, is the principal raisin grape and is also used for wine as well as canning. The American consumer likes a seedless grape and Thompsons are very popular. Emperor is the leading table grape and in Tulare county alone over 5 million boxes are produced. Much of its popularity stems from its good storage and shipping qualities enabling fresh grapes to be marketed practically through to the commencement of the early grapes the next season. Colour is sometimes inadequate by American standards but samples seen were very good in this regard.

Tokay is particularly suited to the Lodi area where it is extensively grown. During the past season heavy rain during harvest caused excessive berry splitting and prevented the marketing of a large proportion of the crop.

Almeria is planted on a more limited scale and used both for local marketing and export. Adequate set is obtained by natural pollination. Some growers interplant with Red Malaga but it is usual to rely on pollen from adjacent plantings often of Red Emperor. At blossoming time growers are advised to run air blast sprayers through adjacent rows with the air stream directed upwards to blow the pollen into the air. Calmeria is now being planted as a long storage variety and will compete with Almeria. Berries are rather larger and longer but flavour is not improved.

Other main table varieties are Ribier, Muscats, Red and White Malagas and Cardinal.

NEW RELEASES

About eleven years ago the University of California, Davis released early varieties, Perlette and Delight and these have been planted in increasing quantities in early districts such as the Coachella Valley. Perlette is now the earliest variety grown, ripening 14 to 20 days ahead of Thompson Seedless. In 1958 over 160,000 boxes were marketed and production is expected to increase substantially. Prices have been in the vicinity of $7.50 per box (£3 7s. 6d.).

It is a white grape, thin-skinned and seedless, fairly good berry size but sugar generally low and palatability only fair. The vine is vigorous and crops well with spur pruning.

Delight is in a less favoured position as a table grape since it ripens about one week later than Perlette. The berries are white, seedless, thick-skinned and firmer than Perlette with a high sugar content. Grapes are of excellent quality and make a good type of raisin.
Other releases are Early Muscat, which is at least a month ahead of other Muscat varieties, July Muscat ripening a little before ordinary muscats but with a much firmer berry, and Gold which ripens with the ordinary muscats. Coloured varieties are Queen which is similar to Tokay but better coloured and slightly earlier and Beauty Seedless, a black variety.

Cardinal which has virtually eliminated Red Malaga was released by the U.S.D.A. in 1946.

TABLE GRAPE SELECTIONS UNDER TEST

The present breeding programme for table grapes operated from Davis is aimed at producing new selections which have similar characteristics to well-established varieties but with improved colour, larger berry size, better bunch characteristics, higher soluble solids and high yields. Selections based on Emperor, Thompsons Seedless, Almeria and Ribier are under test. All selections are seedless or nearly so and have the capacity to yield heavy crops. All are spur bearing. It is felt that the introduction of a selection which is essentially an improvement of a well-tried popular variety will be much simpler than trying to establish an entirely new variety on the market.

Breeding work is also being carried on by the U.S.D.A. at Fresno by Dr. Weinberger.

PROCESSING

Increasing quantities of seedless grapes are going into canning for use in fruit salads. Breeding work is in progress to develop improved varieties—essentials are ease of shattering and seedlessness.

NEW WINE VARIETIES

Recent wine grape releases are Rubired (Alicante Ganzin x Tinta Cao); Royalty (Alicante Ganzin x Trousseau) a port type; Calzin—a red Zinfandel type; Helena—dry white, and Flora an aromatic Treminina type.

Ruby Carbenet and Emerald Riesling were released several years ago. Improvements achieved with the new wine grapes
are high yields, and ability to produce grapes suitable for dry wines under Californian conditions.

**VINEYARD MANAGEMENT**

In the main vine areas of California the soils are sandy and Phylloxera is not a problem. As a general rule therefore, new vineyards are set out as rooted cuttings or less frequently as unrooted cuttings. Normal spacing is 8 to 10 ft. in rows 12 ft. apart. Vertical trellising is usual for Thompsons but for Emperors a two-wire sloping T is general. Tokay and wine varieties are normally trained as bushes on vertical stakes and Almeria on overhead trellis.

Normal spacing is 8 to 10 ft. in rows 12 ft. apart. Vertical trellising is usual for Thompsons but for Emperors a two-wire sloping T is general. Tokay and wine varieties are normally trained as bushes on vertical stakes and Almeria on overhead trellis. Girdling is practiced on Thompsons to improve berry size and in some areas for earliness. Hand thinning is common on table varieties. Both girdling and thinning are costly items and in the breeding programme close attention is being paid to openness of bunch and berry size to eliminate the need for thinning. Heavy thinning of the foliage of Emperors prior to the grapes ripening was being practiced to induce better berry colour.

The climatic conditions of California are apparently not suitable to the development of Anthracnose and no spraying is necessary for this disease. Sulphur is the main fungicide applied for the control of Oidium.

**HARVESTING AND PACKING**

The grape-growing areas of California have low rainfalls, and normally fine warm weather prevails through harvest. It is therefore possible to dry Thompsons outside without dipping. The grapes as picked are placed on paper trays 2 ft. x 3 ft. laid on the ground between the rows and allowed to dry in the sun. When dry each lot is rolled up into a package for transport to the packing house. If rain occurs during the drying period considerable

Fig. 48—Red Emperor vines side-trimmed just before harvest to improve colour

With the exception of some coastal areas vines are irrigated usually from 24 to 60 in., according to location. Summer cultivation is general although a few growers of table grapes are trying mowing the summer growth. Cover crops are not widely used. Girdling is practiced on Thompsons to improve berry size and in some areas for earliness. Hand thinning

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damage can occur unless the grower is able to roll up his fruit ahead of the rain. Dried Thompsons are referred to as raisins and are dark in colour.

Table grapes are either trimmed and packed in the vineyard rows or transported to the packing house in field boxes in the normal way.

Where vineyard packing is practised, the bunches are trimmed by the picker and placed directly in the market containers which then go to the packing house for checking weight and quality. The usual box is the L.A. lug measuring 16\(\frac{1}{2}\) in. x 13\(\frac{1}{4}\) in. x 3\(\frac{1}{2}\) in. inside measurements with a two-piece liner and crinkle board base. It contains 28 lb. of fruit. Flexible lids incorporating 1\(\frac{1}{4}\) in. x 3 in. cleats are applied with mechanical nailing machines. For marketing within the State an open lug 20\(\frac{1}{2}\) in. x 13\(\frac{1}{4}\) in. x 7 3/16 in. with 2 in. cleats is commonly used. This box is un-lined and un-lidded and returnable. Grapes in all packs are packed stems up as a requirement of the trade. Grapes packed in the shed come to the packers in boxes on mechanical conveyors and are inspected and trimmed before being placed in the box. The packing stands incorporate scales which enable filling to a definite weight. The boxes are then placed on another conveyor to take them to the lid-ding machine.

**EXPORT PACKS**

The export chest measures 18\(\frac{3}{4}\) in. x 14\(\frac{15}{16}\) in. x 7\(\frac{3}{16}\) in. (inside) and is packed to a guaranteed nett weight of 34 lb. An excelsior pad containing woodwool is placed in the bottom of the box. The grapes are packed without sawdust and after fumigation are placed un-lidded in cool store. Periodic fumigation takes place until the grapes are required for shipment when 12 lb. of special pine sawdust incorporating sodium bisulphite is added to each box and vibrated through the fruit before lidding. Grapes are shipped to southern American countries and also the Far East. Emperor, Almeria and Ribier are important export varieties.

**FUMIGATION**

Fumigation with sulphur dioxide is now standard practice for all table grapes whether destined for storage or immediate shipment. Storage fruit is fumigated either in special chambers before going into store or in the pre-cooling chamber. As sulphur dioxide is very corrosive, special precautions are taken to prevent the gas coming in contact with the cooling soils. Grapes for immediate shipment are fumigated in the rail cars or road trucks.

Sulphur dioxide has a surface sterilising effect and therefore fumigation should be carried out after all likely injury to the fruit has occurred viz., after packing.

The sulphur dioxide is supplied either in small cylinders containing measured dosages or else the liquid is measured in a dispenser. Either way 0.5 per cent. to 1 per cent. gas is introduced and immediately circulated to obtain uniform distribution. This is important to prevent injury from excessive concentration in some spots and insufficient absorption in others.
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The gas is absorbed rapidly by both the grapes and boxes during the first 10 minutes and over 90 per cent. usually disappears within 20 minutes. Damp boxes absorb more than dry ones and absorption is greater at low temperatures. As the number of boxes in the chamber increases, the dosage must be increased to allow for the additional absorption. Grapes in store are regassed at approximately weekly intervals at 0.25 per cent. $\text{SO}_2$. Thompsons Seedless can normally be stored for six to eight weeks, Tokay eight weeks, Ribier 12 weeks and Emperor five months. With the early and late districts and long storage of Emperors it is possible to have grapes on the market most of the year.

**GRAPE BREEDING**

The breeding programme covers three main classes of grapes:

(a) Table grapes.
(b) Wine grapes.
(c) Canning varieties.

Briefly the procedure is as follows:

Seedlings are raised in the glasshouse in fibre cups during the winter, hardened off in the spring and put out into the field in closely planted rows. The resultant "seedling block" provides the initial selection over three years for such factors as vigour, yield, bunch characteristics and quality. In table grapes, bunch size, berry size, looseness of cluster, colour, seedlessness as well as time of ripening and storage quality are also taken into consideration. For wine types, samples of wine are made from the grapes for assessment. One of the essentials for canning grapes is ease of shattering. All seedlings are spur pruned which automatically eliminates rod bearing types.

It is most important to pre-cool grapes as soon as possible after picking to preserve the greenness of the stems and the firmness of the berries. It is common for grapes to go into the pre-cooling chambers within an hour or two of picking and be fumigated overnight. The temperature at which fumigation is carried out appears to have little effect on the effectiveness of the treatment.
After three years, promising selections from the seedling block go into a "Trial Block" where a number of vines of each selection are grown to afford a more accurate assessment. From the trial block, final selections are made for naming. Material for commercial distribution is raised in the Multiplication Block. Specimen vines of each selection go into the Foundation Block for permanent holding. Seedlings not suitable for commercial selection but carrying some desirable characteristic go into the "Breeding Block" for use in further crosses as required.

**VIRUS INDEXING**

Indexing varieties now being used include:

- St. George for fan leaf.
- Mission for fan leaf, yellow mosaic and leafroll.
- 41B as a quick indicator for vein banding and also for yellow vein.
- Carignane for yellow vein.
- Emperor is not used to any extent because of the time interval involved in developing symptoms.

The procedure adopted is to strike cuttings of indexing varieties in the greenhouse, transfer to the lathhouse for budding with scion material under test and planting out in the field in the spring. The buds do not grow but transmit any virus they are carrying to the index plant. Growth is watched for two to three years for virus symptoms. A foundation block of indexed varieties is maintained as a source of clean material. Visual inspection is made twice annually and the vines are re-indexed every four years.

**HERBICIDES**

Herbicides are not yet widely used in vineyards but trials have demonstrated the value of diuron as a weed control material applied as a 4 ft. band in the vine rows. Application at 4 lb. per acre covered has proved to be very effective but it is not recommended for use on vines younger than 4 years because of possible damage. Application in autumn or winter is recommended. Some damage has been noted when applied at 4 lb. per acre in spring or early summer and the effect on weeds is more erratic. Diuron acts as a soil sterilent and for best results should be applied before seeds germinate. It has limited effect on some established weeds and practically none on some perennials such as Johnson grass.

**SOIL FUMIGATION**

Fumigation of established vines with Nemagon has so far not proved an economic proposition. Trials are at present in progress using water-dispersible material which is flooded on and it was thought results were more promising.

**ROOTSTOCKS**

Rotundifolia is highly resistant to pests and diseases but cannot be successfully propagated from cutting. As a result of
crossing with a vinifera type, a hybrid has now been selected with quite good propagating qualities and retaining a high degree of resistance to nematodes and phylloxera as well as leaf hoppers and mites. This could be very useful on sandy soils and worthy of trials under Western Australian conditions.

Work being conducted by the U.S.D.A. at Fresno has led to the production of two promising rootstocks F131 and F154 both Dog Ridge x 1613 crosses which show considerable resistance to nematodes and phylloxera. These are still undergoing further tests and have not yet been released.

**GENERAL**

**TRIALS** with seven olive varieties have shown that flower formation and yields are related to the amount of winter chilling. Under mild winter conditions, many varieties set little if any fruit. Azapa, a variety with low chilling requirements, is being tried in Southern California and could be useful in Western Australia.

Seedling rootstocks have been found to exert a distinct influence on tree growth and yields. Of three varieties tested, Mission and Manzanillo did very much better on their own roots than when worked on seedling stocks. Sevillano however, was equal or slightly better on seedling stocks than on its own roots.

**WALNUTS**

Payne, Erhart and Early Erhart varieties all have low chilling requirements and may suit Western Australian conditions. The Paradox stock has proved superior for walnuts but is harder to propagate. However, there has been some success in propagating it vegetatively.

During periods of wide temperature fluctuations bleeding is a problem in budding. Slashing the bark or boring the stock above ground level shortly before budding will often times assist the position by relieving the pressure of sap.

**SOIL FUMIGANTS**

Fumazone is now available as an addition to fertiliser pellets, for use as soil applications prior to planting and as side dressings for row crops. The fumigant is lost fairly rapidly and the pellets must be used fairly soon after manufacture.

Methyl bromide is now available dissolved in a solvent so that normal liquid injection is possible. After injection the soil is covered (within 15-20 minutes) with a polythene sheet. Less fumigant seems to be required under these conditions.

Nemagon should not be used with soil temperatures above 90° due to excessive vapourisation.

In 1957, 500,000 acres in the United States were fumigated with various fumigation materials covering a wide range of crops.

**MEDITERRANEAN FRUIT FLY**

It is now two years since the last fruit fly was trapped in Florida in the eradication campaign which cost 10 million dollars and covered an area of 800,000 acres in the largest citrus area of the United States.

The basis of the campaign was detection by trapping followed by rapid knock-down with sprays developed in the fruit fly laboratories in Hawaii. Malathion and hydrolysate of yeast sprays were applied from the air at seven to ten day intervals to coincide as nearly as possible with fruit fly emergence periods. When rain occurred additional sprays were applied. Spraying was normally continued for 30 days after the last fly was found, to cover the expected life cycle of eggs already laid. As a result of the intensive campaign 14 sprays were the most needed to eradicate the pest. A single spray cost about one dollar per acre.

Special transparent plastic traps incorporating a male lure of angelica oil and later synthetic materials were used. Altogether 50,000 traps were in use at the height of the campaign and large numbers are still maintained in the field to check on reinestation.
No fruits were gathered or destroyed as in the 1929 campaign. The only real damage to property was the spotting of paint on motor cars exposed to the spraying.

Recently a new lure has been developed known as Medlure manufactured by Trubeck & Co., of East Rutherford, New Jersey.

MALE STERILISATION

Work is in progress on the control of Oriental Fruit Fly and Melon Fly by means of male sterilisation and full scale trials are scheduled for 1960 possibly on an isolated Pacific island. Later trials are planned with Mediterranean Fruit Fly. The method is based on the successful work with screw-worm eradication.

Laboratories for breeding flies were built and equipped at a cost of one million dollars in Hawaii and to date some 20 billion flies have been bred. The eggs are obtained by inducing the female fly to oviposit through perforations in hollow waxed cups containing papaw attractant. The larvae are raised on a base of carrot plus protein. Sterilisation of the larvae is affected by exposing them to irradiation from cobalt 60. After pupation the flies hatch out normally but males are sterile.

Eradication by this means depends on flooding the population in the trial area with sterile males at the rate of something like ten times the normal male population so that the chance of fertilisation is greatly reduced. By maintaining this high level of sterile males by continual releases it is hoped to eventually achieve eradication as in the case of the screw-worm.

ACKNOWLEDGMENT

Arrangements to visit horticultural centres in England were completed by the Australian Liaison Officer in London and were made possible by the courtesy of the Director and Staff of the Horticultural Research Station, Long Ashton, the East Malling Research Station and the National Agricultural Advisory Service of the Ministry of Agriculture.

In the Netherlands arrangements were in the hands of Mr. Danniels of the Ministry of Agriculture who organised visits to the International Agricultural Centre, Wageningen and also Horticultural Stations at Wilhelminendorp and Naaldwijk.

Visits to experimental stations and fruit-growing areas in the United States were made possible by the courtesy and co-operation of the Agricultural Research Service of the United States Department of Agriculture, New York State University, the Washington State College, the University of California and County Extension Services. The itinerary was arranged in conjunction with Professor R. M. Smock of Cornell University and the Australian Agricultural Attache in Washington.

Full measure of co-operation was freely given at all centres in the various countries visited and everything possible was done to facilitate contacts with research, extension and industry representatives.

I should like to make sincere acknowledgment of the help, courtesy and hospitality extended by the many people I met and who by their efforts ensured a most interesting, profitable and enjoyable trip.

Finally I should like to acknowledge the part played by the Western Australian Fruit Growers' Association in contributing substantially towards financing the trip.

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