Deletion of cover spray for Qfly

By the early 1970s cover spraying was becoming less accepted by the public. There were fears about damage to the environment, deaths of birds and effect on beneficial insects by concerned conservationists and opposition to the current methods increased. Cover spraying was eliminated in 1974 as the emphasis had changed from attempting to kill the immature stages of the pest to killing the adult flies by baiting. However, in this year, the baiting technique appeared to fail, and a modified form of cover spraying was re-introduced. Fenthion was sprayed in an area of 200 to 400 metre radius from the outbreak centre. On 11 November 1974, the Fruit Fly Technical Committee decided cover spraying for Qfly once again could be eliminated, as baiting was adequate to eradicate outbreaks of Qfly; this procedure remains today.

A cover spray of 0.16% fenthion continued to be applied to the outbreak zone of Medfly outbreaks. Cover spray for Medfly was applied to trees bearing fruit and sufficient spray was applied until it began to drip off the leaves. Spraying was every 10 days and it continued for 3 spray periods after the last fly or larva was detected. The withholding period was 7 days before the fruit could be used, and the householder had 3 days to use the fruit before the next spraying. Cover spraying continues to be applied in the outbreak zone of a Medfly outbreak and usually 3 applications at 10 day intervals are applied.

The importance of cover spraying in the outbreak zone was demonstrated In 1980 when cover spraying was omitted at the start of an outbreak of Medfly at Panorama. Flies were still being trapped for 2 months after the commencement of the outbreak, cover spraying was resumed.

Ground spraying

DDT, as a ground spray, was used in 1947 under trees where fallen fruit may have been infested with larvae. The aim was to kill larvae as well as adults which emerged later.

Safer and more effective insecticides to be used for treatment under trees were examined, such as lindane and

granulated dieldrin. Until 1962, DDT was used as a standard treatment under all fruit trees within the outbreak zone, along with dieldrin under infested trees.

Another organochlorine, chlordane, was used as a ground treatment for the first time in 1980 and was applied under trees whose fruit was infested with larvae. The rate of chlordane was 1.25% (1L of chlordane to 80L of water) and about 13 to 14 litres of the solution was applied under each infested tree.

Chlorpyrifos (Lorsban®) replaced chlordane as ground treatment in 1987, as the Department was concerned at the long-term effects that chlordane has in the soil when plants, particularly vegetables, are grown on the site that was sprayed. The rate to be used was 0.176%, i.e. 30mL Lorsban® (500 g/L chlorpyrifos) in 17 litres of water, with 2 to 3 litres of this solution applied per square metre, depending on soil conditions. This treatment is still used in 1997.

Removal of fruit

The eradication procedure during the summer of 1947 included the complete stripping of all fruit from trees within a one mile radius of the centre of the outbreak. The removal and safe disposal of the fruit was aimed at destroying existing larvae, and removal of oviposition sites for female flies still within the area. The removal of fruit to deprive female flies of oviposition sites did not have a sound biological basis, and changes in this procedure are based on the theory that host fruit be left in the outbreak area to encourage female flies to remain.

The first stripping was aimed at the most attractive hosts of the fruit fly, including apricot, peach, nectarine and plum . When the first stripping was complete, other hosts which, in the absence of more attractive fruit, might provide oviposition sites were removed from mandarin, guava, grapefruit, persimmon, cumquat, japonica, orange, ornamental peach, shaddock, ornamental plum, lemon, crab apple, medlar, cape gooseberry, tree tomato, ornamental solanum, prickly pear, grape vines, figs, feijoa, apple, pear and quince. Annual bushes were

removed whole: apple of sodom, sweet melon, tomato, bitter melon (weed), peppers, paddy melon (Weed), eggplant, squirting cucumber, rockmelons and cucumbers. Citrus was stripped during the winter period and blooms from loquat trees were removed to prevent cropping. A Proclamation prohibited, within the outbreak area, the planting or growing, either under glass or in the open, the following plants during the period from the 1 March to 31 October: tomato, sweet melon, capsicum, rockmelon, egg plant and pepper.

A team removing fruit. Later research has shown that fruit removal may hinder control.

In 1949, some entomologists suggested that fruit removal be abandoned because flies deprived of hosts would disperse, making eradication more difficult; however, this idea was not adopted. In 1953 there was a large public outcry against the stripping of fruit trees and the resulting costs, waste, damage and claimed injustice that occurred. Householders petitioned to register gardens and take on measures themselves to combat the fruit fly. However, even this was not sufficient to change existing practices.

In 1964, Dr Steiner of the USDA after, observing operations in South Australia, recommended only stripping of all fruit from infested gardens, and only ripening fruit over the remaining 1/2 mile radius from where the larvae were detected. Winter stripping of citrus over the entire one mile radius area was continued to ensure a host free period from early spring (when the temperature was high enough for egg laying), until the start of the stone-fruit season in early October. Stripping was further reduced in 1967 when only ripe host fruit was removed from the area within 1/4 mile radius of where fruit fly was detected. In 1974, stripping was abandoned and baiting was introduced as the main eradication technique. Unfortunately, an outbreak treated in this way

was not controlled and stripping was resumed within an area of 1/8 of a mile radius. After careful checking, operators found that the control failure was due to incorrect formulation of the bait-insecticide mix, and not related to non-removal of fruit. In 1975, only fruit on infested trees and host trees in the same yard were removed, and ripening fruit, as before, was retained to reduce the tendency for a female fly to move from the area. By the mid-90s, at either a Qfly or Medfly outbreak, only fruit from infested trees, and nearby fruit trees at risk, is removed. Under certain circumstances householders could request removal of fruit instead ofhaving cover spray applied during Medfly outbreaks.

Fruit removal was a source of complaint by backyard growers.

Disposal of fruit

Complaints about the smoke nuisance at Magill in 1957 prompted the Department to move this operation. Burning was done at the Dry Creek dump but, because of smoke nuisance and an objectionable smell, permission to burn there was withdrawn. Plant material was then burnt at the Wingfield dump.

In 1967, both stripped fruit and green plant material was taken to the Tea Tree Gully dump, treated with diesel oil and DDT and covered with 4 feet of overburden. This was effective in preventing emergence of flies, was more convenient than dumping at sea and the cost was halved. At Pt. Augusta, the stripped and bagged fruit was carted to Curlew Point and tipped into holes drilled by the ETSA and covered.

The problems of the disposal of fruit ceased when stripping was greatly reduced in 1975. Presently, fruit is tied in plastic bags after treating with maldison powder and buried under 2 metres of soil.

Male annihilation

A new method of attracting and killing male Qflies was added to the eradication procedures in 1967. Treated absorbent 4 inch x 3 inch caneite blocks, called ‘killer pads’, were impregnated with 10mls of hydroxyphenyl butan 3-1 118.3mL+ Acetoxy phenyl butan 3-1 118.3mL +Technical maldison 236.6mL dissolved in 4544 ml absolute alcohol applied to each side of the pad.

Installing male annihilation blocks.

The pads were placed on a 60 yard grid (2,000 per square mile) throughout the outer 1/2 mile area of an outbreak. They were hung or nailed to suitable trees or telephone poles (with PMG permission) at least 8 feet from the ground so as to be out of the reach of children and their location recorded.

The effective life of the pads was believed to be 12 months, after which they were collected and destroyed. The lure pads were used until 1978, when it was found that their continued use interfered with the lure traps used in to detect outbreaks; some flies went to the canite pads and died, instead of being attracted to the lure traps in the area.

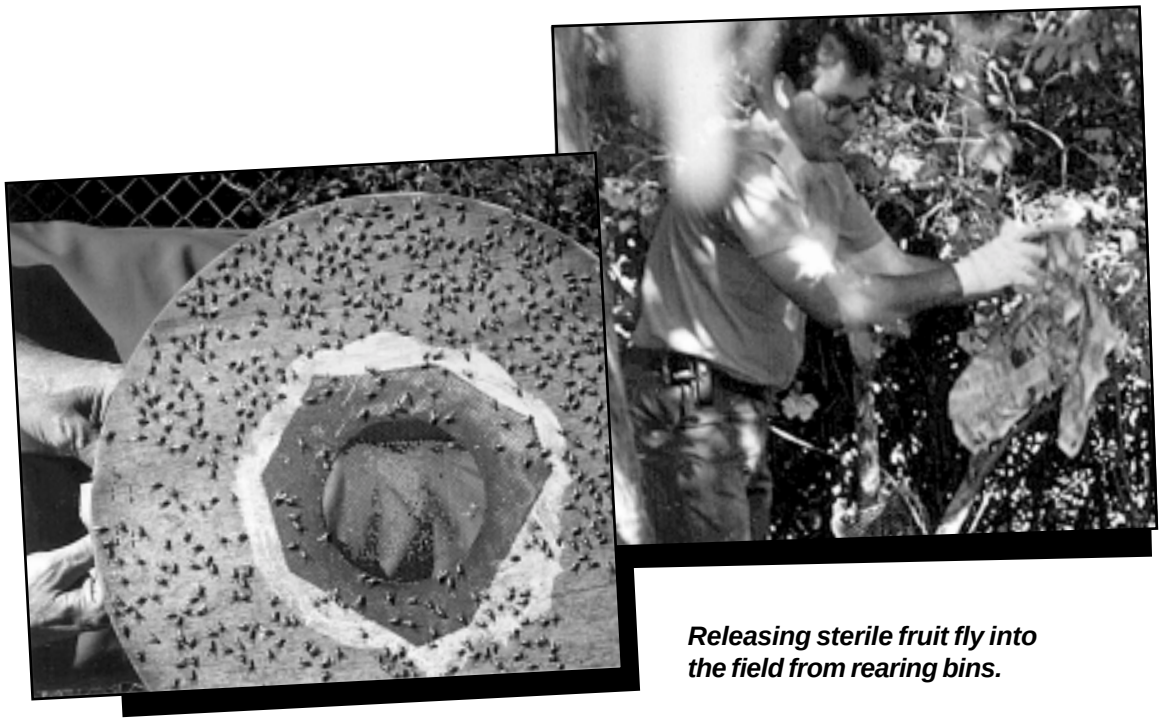
Sterile Insect Technique (SIT)

University of Adelaide entomologists, headed by Professor H.G. Andrewartha, and including John Monro and Noel Richardson were the first to use SIT in Australia. Their aim was to test whether the method would be suitable for eradication of South Australian Qfly outbreaks. Unable to carry out this research in South Australia, they selected a number of towns in western New South Wales for field trials between 1962 and 1965. The flies were reared in a small insectary behind the

School of Zoology, Sydney University, and irradiated at the Australian Atomic Energy Commission establishment at Lucas Heights.

These entomologists demonstrated that the method used in New South Wales could be used to eradicate populations of Qfly which were larger than most South Australian outbreaks. Since this demonstration, it has taken another 30 years for this method to be used in South Australia. It was not until sterile Qflies were readily available from a factory in New South Wales was the method used to treat South Australian outbreaks.

SIT was first used by Peter Bailey and Nick Perepelicia, of Primary Industries South Australia, to treat an outbreak of Qfly in Adelaide from 23 February to 15 May, 1993. In this, and subsequent releases to the 1996/7 season, the area is protein-baited for two weeks, and sterile flies are released for the following 8-10 weeks.



Releasing sterile fruit fly into the field from rearing bins.

Costs and benefits

The identifiable beneficiaries of the fruit fly policy of the South Australian Government have been home gardeners and sections of the horticultural industry.

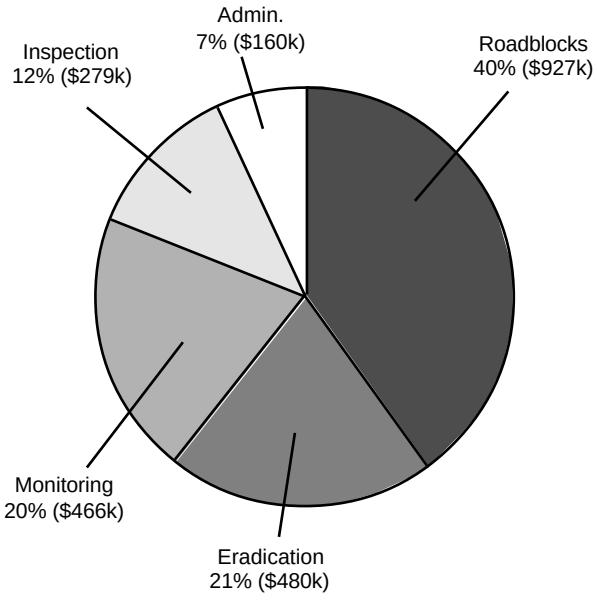
Home gardens. It is likely that the ability to grow fruit in South Australian home gardens without suffering fruit fly damage, or alternatively, without having to treat with insecticide, has encouraged home production of fruit in many households. In 1976, it was estimated that $22m of fruit was produced in South Australian home gardens, based on survey results showing four fruit trees per residence.

Horticultural industry. Of the horticultural industries, the citrus industry has benefited from the internationally-recognised fruit fly freedom status to export fruit, particularly to the US and New Zealand markets, without the necessity of disinfestation treatments which add to costs and reduce the quality.

Costs. All costs of fruit fly operations in South Australia have been paid by the South Australian Government.

The comparative costs of components of fruit fly operations during the 1996/7 year are shown in the pie diagram. The relativities will change from year to year, depending on the number of outbreaks, but the costs of other components do not vary much in recent years.

Cost of fruit fly operations: 1996-7



Present Operations

The present procedures for prevention, detection and eradication of fruit flies are the result of fifty years experience and development of operational techniques suitable for South Australia. At present some 60 staff are employed by the South Australian Government to keep the state free of fruit fly, plus 12 additional staff employed for the duration of each outbreak.

Partnership with the community

The success of fruit fly operations in South Australia is possible only by the support and co-operation of the citizens of South Australia. In the past fifty years, a partnership has developed between the community and government fruit fly operations, in which householders and commercial fruit growers have seen the benefits of producing fruit without the risk of fruit fly damage and have accepted fruit fly control as a community responsibility. In particular, the voluntary reporting by householders of larvae in fruit, and the acceptance by owners of fruit fly operations on their property have allowed the South Australian Government to sustain fruit fly operations.

The Government maintains a community awareness program through a publicity program. There has also been an education program aimed at school children, which has resulted in a generation of fruit fly aware South Australians.

Roadblocks

Private vehicles continue to be the main means of by which fruit fly larvae in host fruits are carried into South Australia from fruit fly epidemic areas on both the east and west coast regions of Australia. South Australia presently maintains four roadblocks on the “high risk” routes into the state. Roadblocks at Yamba on the Sturt Highway between Mildura and Renmark, at Pinnaroo on the Ouyen Highway and at Oodlawirra on the Barrier

Highway between Broken Hill and Jamestown intercept road traffic originating from the eastern part of Australia. The roadblock at Ceduna on the Eyre Highway intercepts road traffic from Western Australia. Total roadblock staff is presently 35.

Motorists who fail to declare fruit ,vegetables and plant material at these roadblocks are subject to an “On the spot fine” or prosecution.

Commercial shipments of fruit are controlled, and require certification from other state governments that the shipment is free of fruit fly, or has been treated to kill immature stages of fruit flies. A total of four inspectors at South Australian fruit markets and entry points ensure that fruit has been properly treated by checking certifications that accompany the incoming consignments.

Detection of adult fruit flies

The trapping grid throughout the Metropolitan Area of Adelaide now consists of 2,707 sites on a 400 metre grid with each site having two traps, one to detect Queensland fruit fly and the other to detect Mediterranean fruit fly. in addition 67 of these sites also have a methyl-eugenol trap on a 5km grid pattern to detect papaya fruit fly and other fruit flies responding to this lure. Separate trapping grids are in the Riverland, including Mypolonga, with 468 sites, each with three types of traps, on a 400 metre grid throughout townships and a 1km grid throughout the horticultural production area. In addition, Port Augusta, Port Pirie, Whyalla and Ceduna have a total of 316 sites on a 400 metre grid.

These traps are monitored on a weekly basis during the period November to May and fortnightly during the period June to October by a total of ten staff.

Eradication

A fruit fly outbreak is officially declared by the Chief Inspector appointed under the Fruit and Plant Protection Act, 1992. The Chief Inspector acts on the decision of the Fruit Fly Technical Committee, which presently consists of the Chief Inspector, the Operations Leader, Fruit Fly, the

Progam Leader, State Quarantine from the Pest Eradication Unit, and an entomologist from the South Australian Research & Development Institute. The reaction time between detection of an outbreak and the start of eradication operations is usually less than several hours in Adelaide, and less than a day in other areas. The official declaration provides the legal basis for the conduct of fruit fly operations, including the movement of fruit from the outbreak area. For each outbreak, an additional 12 staff are employed for field operations.

Identification of adult flies caught in traps is by comparison with reference specimens and/or by taxonomic key. Larvae of Qfly and Medfly are separated by microscopic characters of the cephalopharangeal skeleton and independently by cellulose acetate electrophoresis of the larval homogenate by specialists at the South Australian Museum. The results of these two methods are available within two hours of submission. As a check, some larvae are cultured in a quarantine insectary, and the identity of the emerged adults confirmed some time after the outbreak is declared.

Present methods of eradication depend on the species of fruit fly. Most outbreaks of Queensland fruit fly are treated with the baiting technique integrated with the release of sterile fruit flies. The integrated Chemical and Sterile fruit fly release Eradication Procedure is conducted in two stages. In the first, two to four bait sprays are applied within a 200 metre radius area (outbreak zone) and one to two applications within a 1.5km radius area (outbreak area) over a one to two week period. The bait is a mixture of protein autolosate and maldison insecticide and is applied in 100mL “spots” to foliage at the rate of 100 spots per hectare (6 to 8 spots per household property). To reduce the mortality among the sterile flies, bait spraying ceases four days prior to commencement of sterile releases. Sterile Qflies bred at a factory operated by the New South Wales Department of Agriculture are released at the rate of one to two million per week over the complete outbreak area for a period of up to ten weeks. These flies are marked with a fluorescent powder to allow them to be distinguished from wild flies caught in traps.

Sometimes, it is not possible to use sterile flies, in which case, baiting is continued twice a week for 6 weeks from the last sighting of flies or larvae and then once a week as in the remainder of the outbreak area for a period up to 12 weeks from the last sighting of flies or larvae.

Medfly outbreaks are presently treated by a combination of cover spraying in the outbreak zone and bait spraying in the remainder of the outbreak area. Three applications of a diluted systemic insecticide (fenthion .086 w/v) are applied to all fruit bearing trees in the outbreak zone at 10 day intervals. The spray kills eggs and larvae within the fruit as well as adult flies sheltering in the foliage.

Whether the outbreak is Qfly or Medfly, fruit is not generally removed from trees as a means of control. At most, host fruit is removed from infested trees and from trees immediately adjacent to the infested tree on the property shortly after the discovery of the outbreak. Fallen fruit in the outbreak zone is also collected weekly, treated with insecticide and deep buried every week of the outbreak. A ground spray containing chlorpyrifos is applied under known infested tree(s) to kill any larvae or pupa in the soil.

On completion of eradication programs, householders/property owners are notified and thanked by Primary Industries and Resources SA by leaflets distributed in letter boxes.

Some of the people who made it happen

1974

Front row, left to right:
Unknown, Len Olsen, Sheila Morphett, Jack Botham, Lew Cooper, Nick Perepelicia, Fred Bennett.
Middle row, left to right:
Colin Pitt, Jock O'Hara, Keith Edmonds, Jack Stephens, Basil Vertudacher, Morrie Wren, Harold Slate, Ossie Keys, Bert Brooksley, Peter Skelly, Unknown, Jack Weymouth.
Back row, left to right:
Unknown, Allan Searle, Ray Larsson, Bubba Smith, Jim Haby.

1983

From left to right:
Len Olsen, Glen Barker, Nick Perepelicia, Colin Ward, Katrina Melnyzyn, David McDonald, Julian Madge, Doug Sawyer, Ray Warren, Kevin Black, Neil Renfrey, Bob Fry, John Hayde.

Front row, left to right:
Morrie Wren, Jack Botham, Jock O'Hara.

From left to right:
Noreen Schulz, Nick Perepelicia, Peter Mobbs.

The Early Years after 1947: A personal History.

Tom Miller, formerly Chief Horticulturist, South Australian Department of Agriculture

Adelaide in 1947. A fruit garden city.

Fifty years ago Adelaide was different from what it is today in many respects. It was a fruit garden city. In the earlier years there were many small fruit orchards and these had been subdivided into suburban residential blocks. Mature fruit trees were left growing in home gardens, and many streets had vacant allotments on which fruit trees flourished. Apricots, peaches, nectarines, loquats and oranges thrived and there was a large production of home grown tomatoes. In the suburbs of Glynde, Magill, Marion and elsewhere small commercial orchards remained and in some areas large vineyards with wine and table grapes flourished.

Apple and pear growing was prospering in the Adelaide hills some five to twenty miles from the city and the land along the Murray River at Renmark, Berri and Waikerie was proving to be very suitable for citrus production. The general freedom from pests and diseases was an important factor in the economic production of high quality fresh fruits.

Fruit fly did not exist in South Australia although it was acknowledged to be endemic in the south west of Western Australia [medfly] and in northern New South Wales and Queensland [Queensland fruit fly]. With interstate roads not well developed and air transport just beginning the South Australian fruit growing areas appeared to be safe from introduced fruit pests.

Then suddenly a home grower about three miles south of Adelaide city reported maggots in fruit and almost unbelievably the Entomologist at the Waite Institute of the University of Adelaide identified fruit fly.

Officers of the Horticulture Branch of the Department of Agriculture surveyed the surrounding home gardens and found further infestations . All available trained staff was then employed on an organised and intensive survey and severe infestation was found over an area of several

square miles.

The Department of Agriculture - a small staff in Horticulture.

At this time the HorticultureBranch comprised A.G.Strickland who was Chief Horticulturist and Chief Quarantine Officer Plants, H.K.Kemp Senior Horticulture Research Officer, M.B.Spurling Horticulture Research Officer, R.M.Kain Seed Testing Officer, several District Horticulture Advisers E.H.Leishman, J.B.Harris, C.Grasby and J.P.Jennings. E.Leishman was also the manager of the Blackwood Research Station and E.O.Halliday was manager of the Berri Research Station. This was the full extent of the technical staff. There were some half a dozen fruit Inspectors stationed at the railways and Port Adelaide concerned with the inspection of fruit and plants for import or export. W.B.Harris graduated at the end of 1947 and joined the branch as a Research Officer. Several students who were Horticulture cadets, G.R.Edwards, B.G.Coombe, M.R.Till and V.K.Lohmeyer were added to the technical staff.

The early decisions.

The Waite Institute Department of Entomology and Plant Pathology received government funding to provide an identification service to the Department of Agriculture for pests and diseases and advice on treatment procedures. H.K.Kemp with Dr. H.G. (Andy) Andrewartha and Duncan Swan from the Waite Institute with assistance from officers in New South Wales and Queensland planned the eradication procedures.

Much credit must be given to the specialist officers and to the S.A. Government which with no delay declared a state of emergency and made the decision that *irrespective of the cost and effort required complete eradication should be carried out*. Within a few days hundreds of residents were involved and large quantities of ripe and ripening fruits were taken for destruction.

1.All infested fruit must be collected and destroyed.
2.A surrounding quarantine area had to be declared and host fruits removed.

3.Movement of fruit from the infested area and the quarantine zone by the residents had to be prevented.
4.Apply an insecticide over the area where fruit flies may exist.
5.A continuous programme had to be designed and carried out effectively.
A public relations programme was introduced as the residents, the press and the radio had to be supportive and kept well informed. There was no television.
These measures had to be supported by strong effective legislation and the guarantee of funds.
To gain and maintain public support the Government agreed to compensate owners for all fruit taken .
Each of these activities raised many questions and problems and all had to be answered by the Waite Institute and the Department of Agriculture.

Politicians, Bureaucrats and Entomologists.
It was an enormous asset that the then Premier, Tom Playford,[later Sir Tom] was a fruit grower in the Adelaide Hills. Not only was he personally involved but he was a man with great strength of character and able and willing to see that things were done. He gave full support to the officers responsible.
The Chief Horticulturist, Geof Strickland was a man of great ability. He was competent, able to judge a situation accurately, energetic and able to exert good control. Perhaps his most important quality at this time was that he was respected and able to keep the Ministers and Politicians on side. He was fully trusted and given a free hand.
In that first difficult year, hundreds of people were directly involved carrying out the work and every single one of them would give full credit to the person who thought through the problems, who planned the enormous detail, who directed the staff and sorted everything out. This was Harry Kemp, the Senior Research Officer in the Horticulture Branch. In fact Harry Kemp was the main contributor to the entire campaign. He maintained the pressure in the first year and for several years afterwards. Then he retired from the Department to become an apple grower and then became a highly respected Member of

Parliament.

In 1955 Geoff Strickland was promoted and his place was taken by Tom Miller an unsuspecting applicant from Western Australia. He was experienced in fruit fly control in W.A. and in Pakistan and so with help from the local officers was able to continue the programme.

….And the Public Service

Right from the start it was necessary to call on research and advisory staff from across the Department of Agriculture. These included Soils and Agronomy officers—R.M.Baker, R.Beck, R.Jessup and A.Michelmore. The Engineering and Water Supply Department provided experienced gangers and gangs of workers , trucks and drivers to cart stripped fruit and boxthorns. They also supplied pay clerks to keep records of employees.

Within a short time, the incinerator resources were unable to handle the volume of fruit to be destroyed, so fruit was bagged and weighted with stone obtained from Yatala Prison and dumped at sea with the cooperation of the Harbours Board. Materials used in making up the bait sprays, the design of the fly traps and the mixtures in baiting the traps and indeed the whole programme was continually under review as new information was obtained from interstate and overseas.

The impact of the time spent on this work on the normal duties of the Horticulture Branch was felt most significantly by research staff on whom the technical supervision of the operations depended. This was especially irksome for some of the graduates who expected to be able to undertake the research for which they were trained. It was one of these research officers, Gordon Edwards, who made a detailed investigation of the record of the outbreaks and enabled stripping procedures to be modified, gradually reducing the stripping of host fruits near the centre of an infestation allowing surrounding fruits to be trap fruits to prevent the unnecesary spread of adult flies. This reduced the

amount of stripping and so reduced the cost and public objections.

Other officers who of the Department of Agriculture during who deserve a special mention.These are Dave Kilpatrick, Jack Botham, Lou Smith, Malcolm Allan, Barry McGlasson, Kevin Cellier, Peter Trumble, Wally Mount, Greg Botting, John Steed, Keith Masters, Harry Lower, Malcolm Allender, Rev Cant, Pat Supple, Wally Boehm, Bob Haggerstrom and the assistants from the seed testing laboratory. Most ,if not all of these, worked overtime voluntarily on week days, week ends, over Easter and over New Year holidays when an outbreak was reported. Without overtime, without payment and without any time in lieu.

Compensation Committee.

A fruit fly compensation committee was established to determine the amount of compensation to be paid to householders and to which appeals could be made.Judge Payne was the chairman for many years. He was a well informed home fruit grower and satisfied most appellants.

The role of Entomologists

The technical advice of Professor Andrewartha and Duncan Swan of the Waite Institute was invaluable Helen Brooks of the Waite Institute became the specialist in identifying the species of fruit fly by the spiracle pattern of the maggots. Many suspect specimens of fruit with insect larvae proved to be not fruit fly but Tomato Fly, Carpophilus Beetle, Codlin Moth, Light Brown Apple Moth or Vinegar Fly. The technical officers became familiar with these but all fruit with suspected fruit fly went to Miss Brooks for positive identification. Over many years Dr.Alan May of Queenssland Department of Agriculture, provided much information and took a great interest in the campaign. Dr.Loren Steiner of the University of Hawaii who carried out research on medfly visited Adelaide and was of great assistance.

Fumigation of incoming fruit

After several years of apparently random outbreaks the theory arose that some infested host was coming into the

state and being randomly distributed. Bananas fitted this pattern but were not recognised as host fruit. At that time all bananas came into South Australia by rail on special banana trains once or twice a week from northern New South Wales. As a trial, an insect proof room was set up at the Mile End railway depot and all yellowing fruit was examined. On the first day infested fruit was found These were taken next morning to Sydney where the New South Wales Entomologist, Carl Hely confirmed the identification as Queensland fruit fly with the comment that this was the first time he had seen mature fruit fly maggots in bananas As a result of this finding all bananas imported into South Australia had to be treated with methyl bromide fumigation This was perhaps the first commercial use of post harvest sterilisation in Australia

Road Blocks Installed.

During the fifteen year period after 1947, the first outbreak of medfly occurred in Port Augusta. This pointed to an introduction from West Australia so a trial road block was set up at Ceduna and complete train inspection was commenced between Woomera and Port Augusta. About the same time Queensland fruit fly was reported in Mildura and immediately a road inspection block was set up at Yamba outside of Renmark. These were the first comprehensive road inspection blocks connected with the transport of fruit and the results have meant that they are still in operation today.

CHRONOLOGY

Food baits

1947 - Early: agee jars and treacle tins baited with clensel or vanilla-ammonia; later 200 glass invaginated (McPhail) traps with orange rind extract/ammonia in solution

1951 - 500 McPhail traps with ammonia-vanilla lure

1952 - Oil of angelica plant and seed tried for 2 years

1954 - Lure reverted to ammonia-vanilla

1962 - Protein hydrolysate-vanilla-ammonium chloride lure; use of supplementary traps around infested trees

1979 - Trial of protein 50% and added water 50% was not successful as a lure

1983 - Low salt protein autolysate replaced hydrolysate in the lure

Male lures and dry traps - Qfly

1957 - Test with anisyl acetone as a lure; invaginate glass traps with Staley's protein bait No.7 and maldison

1960 - 449 Bateman traps introduced with Willison's lure on a 1/2 mile grid in metropolitan area

1962 - Unsuccessful test of ammonium carbonate-orange as a lure

1963 - 1/4 mile grid in metropolitan utilising 1290 traps

1964 - Change to cuelure maldison and alcohol as the attractant; 3.5cc on the wick; trap numbers increased to 1382

1965 - Trap density increased to 40 per square mile over entire metropolitan area (1440); also at Pt. Augusta (30) and Pt. Pirie (38)

1973 - 1875 traps being serviced

1974 - Density of traps increased to 50 per square mile

1976 - Pt. Pirie grid extended to 71 traps; monitoring of Riverland area first discussed

1979 - Steiner trap; Queensland modification replaced the Bateman trap using 5cc of cuelure and maldison on the wick

1981 - Metropolitan grid reorganised and increased to 2172 traps and also Pt. Augusta to 83 traps; 137 traps installed at Whyalla

1982 - New grids at Ceduna with 34 traps and in a risk area at Berri with 9 traps

1983 - New grid at Port Lincoln (75) and Renmark (22); test of 10 Jackson traps in metropolitan area; improved distribution of metropolitan grid with trap numbers increased to 2280

1985 - Jackson ‘sticky’ traps replaced Steiner traps

1986 - Grid of 341 traps installed in Riverland towns and orchards at 400m grid and 1 per sq km in commercal orchards; addition of 290 traps to southern metropolitan area; Trap numbers in S.A. metropolitan 2604, Port Pirie 80, Port Augusta 92, Whyalla 135, Port Lincoln 64, Ceduna 35, Riverland 345; Total 3355 traps

1991 - Lynfield dry trap replaced the Jackson ‘sticky’ trap for Qfly

For both pest species:

1992 - Trapping grid removed from Port Lincoln

1994 - Trap numbers in the State were: metropolitan 2604, Port Pire 84, Port Augusta 81, Whyalla 120, Ceduna 32, Riverland 343; Total 3264

Male lure and dry traps - Medfly

1948 - Invaginated glass traps with orange rind extract-ammonia as a lure

1950 - Lure changed to vanilla and ammonia

1957 - Invaginate glass traps with medlure ENT 21484

1961 - 391 glass traps on 1/2 mile grid in metropolitan area with trimedlure

1962 - Test using ‘dack-pots’ was not successful

1963 - Steiner trap replaced the invaginate glass trap at 1/4 mile grid in metropolitan area, with an attractant of trimedlure and glycerine; tray in the trap contained lindane 20% and chlordane 15%

1964 - 1386 traps at a density of 40 per square mile

1965 - Trap numbers in the State were: metropolitan 1440, Port Augusta 75, Renmark 6, Berri 6, Waikerie 6, Loxton 6.

1966 - 38 traps at Port Pirie; 7cc of trimedlure on wick

1970 - Israeli traps replace Steiner trap; attractant mixture trimedlure 4000mL, DDVP 93% 40mL with 5cc in each wick

1974 - 1875 traps being serviced

1980 - New grid of 137 traps at Whyalla due to outbreak

1981 - Metropolitan grid reorganised and increased to 2172

1982 - New grid of 34 traps at Ceduna, due to outbreak; 9 traps in a risk area at Berri

1983 - Improved distribution of metropolitan grid with trap numbers increased to 2172; new grid at Port Lincoln (75) and Renmark (22)

1985 - Jackson ‘sticky’ traps replaced Israeli traps

1986 - Capilure® replaced trimedlure; addition of 290 traps to southern metropolitan area; trap numbers in S.A. metropolitan 2604, Port Pirie 89, Port Augusta 92, Whyalla 135, Port Lincoln 64, Ceduna 35, Riverland 345. Total 3355 traps

1992 and 1994 - See above

Bait sprays

1947 - 2oz (56.6g) tartar emetic, 2lb (0.91kg) brown sugar, 4 gals (15.14L) water 6fl oz/spot/7days

1948 - DDT 0.1% (2lbs of 50%wp DDT in 100 gal water); also applied on ground where windfalls were suspected of being infested with larvae; two sprayers operated from each power unit, each with a 250 ft length of hose attached; by 1950, Department had 6 power units

1957 - 0.15% maldison; 0.2% imported yeast hydrolysate; 1 quart (1.4L) Staley protein insect bait No.7, 2lb (0.91kg) maldison 25% WP, sugar, 15.14L (4 gals) water every 7 days

1963 - sugar not added

1965 - 340g (0.4%) protein hydrolysate, 255g (0.35%) maldison 25% WP, in 15.4L (4 gals) water at 150mL/tree

1971 - 283g (10oz) protein hydrolysate, 255g (9oz) maldison 13.6L (3 gals) water at, 1/2 pint tree

1972 - protein-maldison spot, technique seriously examined; 4g (0.14oz) active protein hydrolysate, 1g (0.035oz) active maldison, 100mL (3.5fl oz) water

1974 - baiting failure, as mixture was: 56g actual instead of 620g protein hydrolysate 21%, 70g actual instead of 154g maldison 25% in 13.2L (3.5 gal) water

1974/75 - 1 L protein autolysate (420 g/L protein), 142mL maldison 115wv, 16L water at 50 spots/ha, twice weekly in inner area, once in outer area area

1981 - 850mL protein autolysate, 147mL maldison, 115wv, 16L water

1982 - 1L low salt protein autolysate, 420 g/L protein, 174 mL maldison 115 WV, 18.8L water at 100 spots/ha or 6- 8 spots (100mL/spot) each yard

Ground and cover sprays

1947 - Sweetened tartar emetic plus water

1948 - DDT 2lbs of 50%wp, 100 gal (45.6L) water; idea of spraying by air abandoned; arsenical spray for boxthorn

1957 - 0-1/4 mile, DDT every 14 days as cover spray, including winter and spring; 1/4-1 mile, DDT every 21 days; DDT under infested trees; review of use of DDT because of harmful side effects

1962 - 0-1/4 mile, fenthion at 0.0590 as cover spray every 4 weeks including winter; dieldrin under infested trees

1963 - 0-1/4 mile, fenthion first spray 0.08% then 0.04% every 4 weeks

1972 - Cover spraying less acceptable and cards left with householders

1973 - 0-1/4 mile, fenthion every 14 days

1974 - 200 to 400m fenthion at 0.16% for Medfly, 3 applications at 10-day intervals

1980 - Chlordane as ground treatment replaced DDT

1987 - Chlorpyrifos replaced chlordane

Removal of fruit

1947 - 0-1 mile, primary hosts then secondary hosts, summer andwinter fruit

1949 - 0-1 mile, commercial growers could remove fruit

1953 - 0-1 mile, commercial growers outside 3/4 mile radius could remove fruit; petition to register gardens not accepted

1957/58 - 0-1 mile, ripe primary hosts, then remainder 2 weeks later

1963 - 0-1/4 mile, primary and secondary hosts; 1/4-1 mile, primary hosts; 0-1 mile, removal of citrus in winter; planting prohibited of host that would fruit before 1st October; planting of tomatoes only by permit

1967 - 0-1/4 mile, host fruit at risk

1974 - Stripping deleted, later resumed to 0-1/8 mile

1975 - Only infested and host trees where infested trees found; for 0-1/8 mile radius, fruit removed if not cover- sprayed (Medfly)

Disposal of fruit

1947 - Fruit to Council incinerator in Halifax Street; bagged fruit dumped at sea 15-20 miles from Glenelg; later, fruit dumped at sea 3 miles from Outer Harbour; green plants burnt at Magill

1948 - Bagged fruit treated with DDT before dumping

1957 - Green plants burnt at Dry Creek, then Wingfield

1957/58 - At Pt. Augusta, fruit placed in holes dug by ETSA at Curlew Point

1967 - Fruit and green plants treated with dieseline and DDT; buried at Tea Tree Gully dump

1975 - Revised program meant little fruit for disposal; fruit treated with maldison, into plastic bags, buried 2 metres deep, under Departmental supervison.