CHEMICAL CONTROL OF THE TEA TORTRIX (*HOMONA COFFEARIA* NIETNER)

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Of nineteen insecticides evaluated, the best control of the Tea Tortrix Caterpillar (*Homona coffearia* Nietner) was given by DDT. DDT (18 to 25% EC) at the rate of four to six pints per acre gave satisfactory tortrix control for a period of over two months. The earlier recommendation of trichlorphon (Dipterex) was found to be less effective than DDT and is therefore withdrawn. There was no difference in the degree of control obtained with either low-volume or high volume applications of DDT. DDT showed no adverse effects on the population of the tortrix parasite *Macrocentrus homonae*.

Tea tortrix (*Homona coffearia* Nietner) numbers are naturally kept in check by the parasite, *Macrocentrus homonae* Nixon. Although controlled by the parasite, tortrix populations generally show seasonal fluctuations depending on weather conditions. Dry weather conditions tend to increase caterpillar numbers by reducing the incidence of diseases of caterpillars caused by pathogens. In this respect, a bacterial wilt disease and a fungus disease that commonly occur during wet weather appear to be important. During the rainy seasons, the larvae and pupae are severely attacked by these diseases and the natural balance is shifted more in favour of the activity of *M. homonae*. For these reasons, tortrix outbreaks can occur during the inter-monsoonal dry seasons. When outbreaks occur early in the dry season, chemical control measures are necessary if extensive damage is to be avoided.

The more recent recommendations for tortrix control were given in a research publication by Cranham, Ranaweera & Rajapakse (1962), in two advisory leaflets (Cranham 1964; Cranham & Danthanarayana 1966) and in the Entomology Wall Chart of the Tea Research Institute of Ceylon in 1966. In these publications, DDT (18-25% EC) at the rate of four to six pints per acre or two applications of trichlorphon (Dipterex SP 80) at the rate of 1½ to two lb per acre are recommended. As DDT may sometimes have the disadvantage of inducing a build up of the mite population, trichlorphon was recommended particularly for fields which have a history of repeated mite attacks. In view of the reports received during the last few years that trichlorphon has, in many instances, failed to give lasting control of Tortrix, experiments were conducted to investigate the problem. Experiments were also carried out to evaluate insecticides that have not been tested against Tortrix before. The results of these experiments are reported and discussed here and the present position regarding tortrix control is clarified.

Materials and methods

Altogether, five experiments were carried out. One (**E18***) was located at Waltrim Group, Lindula, and the others at St Coombs. The experiments were of the randomized block design with six replicates in experiments **E18** and **E37** and four replicates in experiments **E36, E57** and **E58.** The experiments were carried out on seedling tea, one or two years from pruning during the months from January to June 1965, 1966 and 1968. The size of the plots varied depending on the area available for each experiment. The plot sizes were ¼ acre (**E36**), 1/20 acre (**E57**), 1/50 acre (**E18 & E37**) and 1/100 acre (**E58**). In all the experiments, in addition to the chemical treatments, an untreated control was included. The

*See TRI Annual Reports for experimental details treatments are listed in Tables 1 to 6. Applications of insecticides were carried out with hand-operated knapsack sprayers having nozzles with disc size 1.6 mm, with a spray volume of 50 to 60 gallons of water per acre. In all experiments, except **E18**, a single application of one lb ai dieldrin per acre was given on the entire experimental area in order to induce a heavy build up of the tortrix population. This spraying was done about two months before the commencement of the treatments.

The efficacy of different treatments was evaluated twice, once at the end of the first week after spraying and again at the end of the second week after spraying. For this purpose, a sample of ten bushes was taken from each plot and the total number of all but first-instar larvae surviving was recorded. The bushes to be sampled were selected at random but covered most rows in a plot so that the sample was similar to a 'stratified random sample'. This method of sampling was considered to be suitable in view of the possible heterogeneous distribution of caterpillars. Bushes sampled once were not sampled again on subsequent occasions. In all experiments, a pre-treatment sample was taken a few days before the insecticide applications in order to obtain data for covariance analysis, if necessary. The data collected were subjected to analysis of variance or covariance.

The methods adopted in the case of experiment **E36** were in some respects different to those described above. In this experiment, the insecticides were applied with mistblowers, and as such the plot size was made rather large(1/4 acre) in order to avoid possible spray drifts. For sampling, 50 bushes were selected instead of ten, at random from each plot, and six post-treatment samples were taken up to 14 weeks.

Experimental & results

Experiment E36

In this experiment, 1.9 lb DDT (6 pints DDT 25% EC) was compared with two applications of 1.6 lb trichlorphon (2 lb Dipterex SP 80) and the untreated control. The second application of trichlorphon was carried out four weeks after the first application. The insecticides were mistblown with spray volumes of ten and 20 gallons of water per acre respectively. Dipterex, being a solid formulation, required this larger volume of water in order to ensure proper dispersal. The results given in Table 1 (Figure 1) show that DDT gave effective and significantly better control of the larvae throughout the period of sampling upto 14 weeks. Trichlorphon on the other hand, showed significant differences from the untreated control, only in samples taken just after the two sprayings had been done. The results clearly indicate that DDT provides more effective and persistent tortrix control than trichlorphon (Dipterex).

TABLE 1—*Control of Tea Tortrix with DDT and trichlorphon (Dipterex)*

Treatment	Dose (lb ai per acre)	Pre-treatment count	Mean No. of larvae per sample of 50 bushes — Post-treatment counts after 1 week	2 weeks	4† weeks	6 weeks	9 weeks	14 weeks
DDT	1.9	841	53*	30*	22*	25*	81*	204
Trichlorphon (Dipterex)	3.2	1071	580*	760†	588	162*	233	396
Untreated control		1094	1421	1108	1113	724	342	295
LSD at $P = 0.05$			410	440	526	234	183	180

**Significantly different from the untreated control* ($P < 0.05$)

†*Second application of trichlorphon was done at the end of four weeks*

Experiment E37

The insecticides tested in this experiment were aminocarb (Metacil 80% WP), dichlorvos (Vapona 48% EC), arprocarb (Unden 20% EC), DDT (25% EC) and a mixture of aminocarb (Metacil) and trichlorphon (Dipterex) as suggested by the manufacturers (Table 2). The results presented in Table 2 show that one week after treatment, DDT, aminocarb, and the aminocarb-trichlorphon mixture caused significant reductions in caterpillar numbers. At the end of the second week, plots sprayed with all insecticides except arprocarb had significantly lower caterpillar numbers than the untreated control. Comparisons by taking only the mean number of caterpillars per sample, indicate that the aminocarb-trichlorphon mixture and DDT performed better than the other treatments.

TABLE 2—*Control of Tea Tortrix with insecticides*

Treatment	Dose (lb ai per acre)	Mean No. of larvae per sample of 10 bushes: Pre-treatment count	Post treatment counts after: 1 week	2 weeks
Aminocarb	0.8	109	15.0*	17.2*
Arprocarb	0.5	139	41.0	43.7
Dichlorvos	0.5	149	48.0	17.2*
Aminocarb+trichlorphon	0.4+0.8	144	13.5*	8.7*
DDT	1.9	141	6.0*	18.2*
Untreated control		108	67.0	37.7
LSD at $P = 0.05$			27.3	16.4

*Significantly different from the untreated control at $P < 0.05$

Experiment E57

This experiment was conducted in order to evaluate the efficacy of certain insecticides not included in the previous experiments, so that they could be compared with DDT and the aminocarb-trichlorphon mixture which gave good results in the previous experiment. The insecticides evaluated were: azinphos-methyl (Gusathion 20% EC), fenitrothion (Sumithion 50% EC), methyl parathion (Folidol M-50), SD 8447 (Gardona 50% WP), Du Pont 1179 (Lannate 90% DP), GS 13005 (Supracide 40% WP) and aminocarb (Metacil 80% WP). Altogether there were ten treatments including the untreated control. The results of this experiment are presented in Table 3. One week after treatment, none of the treatments produced any significant difference in caterpillar numbers from the untreated control. When the number of caterpillars per sample was considered, however, it was found that DDT gave the lowest count. The results at the end of the second week were more conclusive. Again the best results were given by the DDT treatment which alone was significantly different from the untreated control. The results also show that the aminocarb-trichlorphon mixture which proved to be good in the previous experiment did not perform as well as might have been expected.

TABLE 3—*Control of Tea Tortrix with insecticides*

Treatment	Dose (lb ai per acre)	Mean No. of larvae per sample of 10 bushes: Pre-treatment count	Post-treatment counts after: 1 week	2 weeks
Azinphos-methyl	0.25	159	180	88
Fenitrothion	0.62	183	206	160
Methyl parathion	0.62	121	149	72
Gardona	0.62	179	390	124
Lannate	0.62	101	160	77
Supracide	0.56	227	190	152
DDT	1.90	177	89	46*
Aminocarb+trichlorphon	0.40+0.80	194	147	76
Aminocarb	0.80	125	108	74
Untreated controls		205	274	160
LSD at $P = 0.05$				107

*Significantly different from the untreated control at $P < 0.05$

Experiment **E58**

In this experiment, more new insecticides were evaluated, together with higher doses of some of the insecticides from the previous experiment. The new insecticides included were: H 14503 (40% EC), dioxathion (Delnav 80% EC), SD-9129 (Azodrin 50% EC), and phosalone (Zolone 35% EC). DDT in combination with methyl parathion which performed fairly well in the previous experiment was also included as a new treatment. Altogether there were 12 treatments including the untreated control. The rates of application of insecticides and the results obtained are given in Table 4. At the end of the first week, eight of the eleven insecticide treatments gave significantly better results than the untreated control. In the second sample, taken one week later, only DDT, the DDT-methyl parathion mixture and Lannate showed significantly lower counts of caterpillars when compared with the untreated control. When the mean numbers of caterpillars per sample alone was considered, it was found that DDT gave the best results (Table 4).

TABLE 4—*Control of Tea Tortrix with insecticides*

Treatment	Dose (lb ai per acre)	Mean No. of larvae per sample of 10 bushes: Pre-treatment count	Post-treatment counts after: 1 week	2 weeks
DDT	1.90	286	263*	99*
Methyl parathion	1.25	244	302*	201
Aminocarb	1.60	493	260*	168
Lannate	1.12	370	228*	132*
Gardona	1.60	434	354*	399
Fenitrothion	1.25	558	533	268
H–14503	1.00	333	329*	324
Diosathion	1.00	569	467	405
Azodrin	1.25	361	294*	337
Phosalone	0.50	499	645	352
DDT+methyl parathion	1.25+0.63	295	198*	124*
Untreated controls		471	697	369

*Significantly different from the untreated control at $P < 0.05$

NB—Analysis of covariance carried out on $\sqrt{n}$ values.

Experiment E18

The insecticides tested in this experiment are as follows: DDT (25% EC), perthane (Perthane 40% EC), ethion (Ethion 40%EC), formothion (Anthio 25% EC), fenitrothion (Sumithion 50% EC), aminocarb (Metacil 80% WP) and naled (Orthodibrom 25% EC). The rates of application and results obtained are presented in Table 5. On both occasions of sampling, none of the treatments were found to differ significantly from the untreated control. The mean numbers of caterpillars per sample and the percentage kill, however, indicate that the best results were given by the DDT application. In this experiment, heavy rains were experienced three hours after spraying, and the rain continued during the three successive days, during which a total of 3.09 in. were recorded. The results may have been more conclusive if there had been clear weather after spraying.

TABLE 5—*Control of Tea Tortrix with insecticides*

Treatment	Dose (lb ai per acre)	Mean No. of larvae sample of 60 bushes and % kill: Pre-treatment count	Post-treatment counts after 1 week	Post-treatment counts after 2 weeks
DDT	1.9	308	92 (70%)	66 (79%)
Perthane	1.5	385	112 (71%)	85 (78%)
Ethion	0.75	289	174 (40%)	110 (62%)
Formothion	0.5	452	120 (74%)	125 (72%)
Fenitrothion	1.25	303	117 (61%)	84 (72%)
Aminocarb	1.6	281	197 (30%)	152 (46%)
Naled	0.62	419	191 (55%)	167 (61%)
Untreated	—	253	159 (37%)	176 (30%)

Field trial

To supplement these experiments, a field trial was conducted at Mattakelle Estate, Talawakele, to determine the efficacy of DDT and trichlorphon (Dipterex) when used on a large scale. The opportunity was also taken to see if there is any difference in the degree of control obtained between low-volume spraying (mist-blown) and high-volume spraying (Knapsack sprays). The trichlorphon treatment was given in two applications, the second application being carried out at the end of four weeks after the first. The plots were large, each covering one acre, and the treatments (see Table 6) were not replicated. DDT (18% EC) was applied in ten gallons (low-volume) and 50 gallons (high-volume) of water per acre. Trichlorphon (Dipterex 80% SP) was applied in 20 gallons (low-volume) and 50 gallons (high-volume) of water per acre. The efficacy of the treatments were determined by taking larval counts from 100 bushes selected at random from each plot. One pre-treatment sample and five post-treatment samples were taken. The results are presented in Table 6, and support the findings of the previous experiments and indicate that DDT(18% EC) at the rate of six pints per acre gave better control of tortrix than trichlorphon (Dipterex SP 80) at the rate of four lb per acre given in two applications. Further, there was no clear difference between the low-volume (LV) and high-volume (HV) applications of both insecticides. Low-volume applications, however, appeared to be marginally superior (Table 6).

TABLE 6—*Control of Tea Tortrix with DDT and trichlorphon (Dipterex)*

Treatment	Dose (lb ai per acre)	Pre-treatment count	No. of larvae per sample of 100 bushes and the degree of kill expressed as % of pre-treatment count Post-treatment counts after 1 week	4† weeks	7 weeks	10 weeks	13 weeks
DDT—(LV)	1.4	1147	50 (96%)	65 (94%)	667 (42%)	432 (62%)	73 (94%)
DDT—(HV)	1.4	520	30 (94%)	75 (86%)	301 (42%)	221 (57%)	43 (92%)
Trichlorphon—(LV)	3.2	854	135 (84%)	355 (58%)	530 (38%)	570 (33%)	400 (53%)
Trichlorphon-(HV)	3.2	626	163 (74%)	420 (33%)	299 (52%)	558 (11%)	211 (66%)

(LV = Low volume ; HV = High volume)

†The second application of trichlorphon was carried out at the end of 4 weeks after the first

Effect of DDT spraying on the tortrix parasite, Macrocentrus homonae

It is well known that one of the causes for tortrix outbreaks is dieldrin (and to a lesser extent, aldrin and heptachlor) spraying for shot-hole borer control (Danthanarayana 1966; 1967). As dieldrin is a wide-spectrum insecticide, in additon to the Shot-hole Borer, it also eliminates many other insects, including useful parasites such as *M.homonae*. The parasitism of Tortrix by *M.homonae* is always low for a few months after dieldrin spraying. It usually takes from four to six months for the parasite to be fully re-established. It will be recalled that in the experiments described above, dieldrin was sprayed initially to induce a heavy build up of the tortrix population. As a result, the degree of parasitism was very low at the commencement of these experiments.

In order to determine whether DDT or trichlorphon (Dipterex) had any detrimental effects on *M.homonae,* and therefore interferred with its re-establishment, larvae collected during the sampling of Experiment E36 were regularly dissected for parasites. The results of these dissections are given in Table 7, where the degree of parasitism has been expressed as the percentage of the total number of larvae collected. The results show that for a period of nine weeks after spraying, the parasitism was either *nil* or very low in all treatments. This was the result of the dieldrin spraying carried out earlier. By the 14th week, parasitism in the DDT-treated and the untreated plots reached 41 and 40% respectively, clearly indicating that DDT spraying had not inhibited the resurgence of the parasite. Parasitism in the trichlorphon (Dipterex) treated plots, however, was low at 27%.

TABLE 7—*Effect of DDT and trichlorphon on* M.homonae

Treatment	Dose (lb ai per acre)	Pre-treatment count	Percentage parasitism of tortrix larvae by *M.homonae* Post-treatment counts after 1 week	2 weeks	4 weeks	6 weeks	9 weeks	14 weeks
DDT	1.9	0.25	0	0.5	0	0	1	41
Trichlorphon	3.2	0	0.25	0	0	0	1	27
Untreated controls	—	0	2	5	2	2	2	40

Discussion and conclusions

One consistent feature of these experiments was that, of the different types of insecticides evaluated, which totalled 19 in all, DDT gave the best tortrix control. The other insecticides tested earlier to this were carbaryl, dimethoate, malathion, methoxychlor, phosphamidon and TDE (Cranham 1965 ; Cranham *et al.* 1962). Considering the fact that most of the insecticides examined so far, are well known for their usefulness for caterpillar pest control on other crops in Ceylon and elsewhere, it is clear that DDT is the best tortrix killer available for use on tea today. It would be opportune to mention here that DDT in addition, controls the whole range of caterpillar pests of tea in Ceylon (see Cranham 1966; Danthanarayana 1967).

In the experiments where DDT and trichlorphon (Dipterex) were compared, the results clearly showed that DDT is far superior to trichlorphon. A single application of 1.4 or 1.9 lb DDT (six pints 18 or 25% EC) per acre gave significantly better and more persistent control of Tortrix than two applications of 1.8 lb trichlorphon (two lb Dipterex SP 80) per acre. This was evident in the plot experiments as well as in the large-scale field trial. Trichlorphon was found to be less active than DDT for tortrix control and its effect was felt mostly during the first week after application (see Figure 1). One of the main reasons for the earlier recommendation that trichlorphon be used as an alternative to DDT (Cranham *et al* 1962) was the fact that DDT has the disadvantage of inducing the build up of red spider (*Oligonychus coffeae* Nietner) and scarlet mite (*Brevipalpus californicus* Banks) populations in some areas, during certain times of the year. When DDT was used against Tortrix, it therefore, had often to be followed up with mite control measures incurring additional expense. Recently, however, Cranham (1966) showed that the mite side-effect problem of DDT can be prevented by the addition of a small quantity of the acaricide dicofol (Kelthane) into the DDT solution. As an alternative to dicofol,

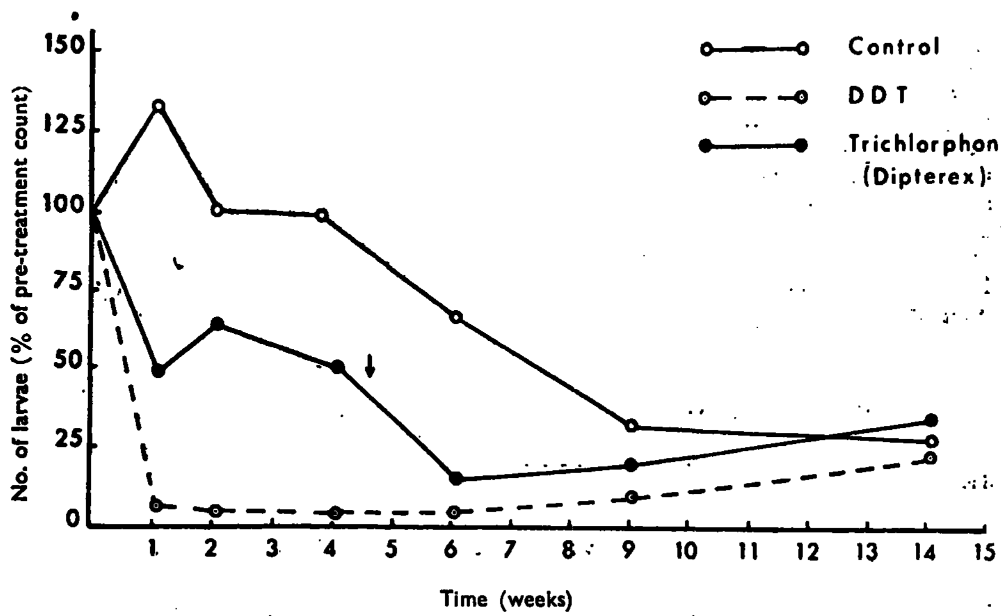

FIGURE 1 — *Survival of tortrix larvae after DDT and trichlorphon (Dipterex) application — The numbers of larvae surviving are expressed as a % of the pre-treatment count — The arrow indicates when the second round of trichlorphon was applied*

tetradifon (Tedion) may also be used, but tetradifon is generally effective only against the Red Spider Mite. By incorporating an acaricide into the DDT spray, labour costs on a subsequent round of mite control measures are avoided. It is clear, therefore, that the mite problem associated with DDT spraying can be definitely avoided.

It need hardly be emphasized that economy is an important factor that merits consideration in tea pest control today. The best way of achieving economy, in this instance, is to use the cheapest effective chemical at the most appropriate time so that repeat applications become unnecessary. DDT, which is the most efficient insecticide against Tortrix, is one of the less costly (if not cheapest) insecticides available today; its cost per acre comparing very well with that of any other possible alternative. This will not alter greatly, even when the cost of Kelthane is added. In this respect it will be well worthwhile to remember that there are several brands of DDT marketed in Ceylon which are priced differently.

The correct timing of insecticide applications is yet another contributory factor towards a positive approach in effective and economic pest control. This type of spraying will obviate the necessity of repeat applications, and will also prevent the further spread of the pest from infested to uninfested fields. As the Tea Tortrix is generally a dry weather pest, its outbreaks begin in February/March in the south-west monsoon zone and last till May/June (see Figure 2). In the north-east monsoon zone, outbreaks begin in June/July and continue till September/October. It would be best if the DDT spraying is done early in the tortrix season, when the caterpillars first begin to appear. Another noteworthy point associated with the tortrix problem is that outbreaks in the Dimbula and Dickoya Districts, as well as in the Uva Province, occur during the quality and flavoury season, a time when the yield per acre is more than usually important. Probably a less-thought-of factor is the tainting that can be imparted to tea manufactured from flush harvested from heavily-infested fields. There is a distinct advantage, therefore, in looking out for Tortrix during the periods mentioned above.

The question of the number of spraying rounds required and also the mode of application of the spray arises. These points were investigated in experiment E36 and in the large-scale field trial. A single round of DDT applied in dry weather, was found to be effective for over two months (Figure 1). The degree of control obtained during the first six weeks was well over 90%, and the control was as high

FIGURE 2 — *Seasonal changes in tortrix numbers at No. 13 Field, St Coombs in 1961 — The arrow indicates the most appropriate time for spraying DDT*

as 75% during the next six weeks. One application of DDT carried out early in the tortrix season will, therefore, be sufficient until the arrival of the monsoon rains about three months later. To illustrate this point, the larval numbers in St Coombs (Field No. 13) for 1961 are presented in Figure 2. The outbreaks which began in January/February ended in April/May. Control measures applied in February would have been effective for the entire period of the outbreak. Although Figure 2 indicates the general pattern of the build up of the population of Tortrix in the south-west monsoon zone, deviations can be expected depending on variations in the weather. Unusually long dry periods will prolong the duration of the attacks. Under such conditions two applications of DDT will be necessary, depending on the extent of infestation. The second application will probably be required about two months after the first.

No difference was observed between the two methods of DDT application. In experiment E36, good results were obtained with low-volume application (mistblowing), whereas in the other experiments similar results were obtained with high-volume (knapsack) spraying. In the large-scale trial, in which the two methods were compared, both were found to be equally effective. Mistblowing, of course, is advantageous, because it is more economical, with greater speed of operation and is especially useful when water is scarce. For mistblowing DDT, ten to fifteen gallons of water will be needed per acre, depending on the spray-cover requirements. The lower volume (10 gallons) will usually suffice for one to two-year-old fields (from the time of pruning) and the higher volumes for older fields. With knapsack sprayers, the water requirement is fifty to sixty gallons per acre. When spraying is carried out for insect and mite pest control, more water is required than for example in blister blight control because insects and mites attack older leaves as well, which Blister Blight cannot attack. With insects and mites, the aim is to obtain a very high degree of control of over 90 per cent, whereas with Blister Blight, the aim is to keep the infection lower than 25%. Spraying against Tortrix will also require good supervision, in order to obtain an uniform cover with no bushes left unsprayed. It is suggested that the number of labourers per acre suggested below be used.

Recommendations

1 — The present recommendation for the control of Tea Tortrix with DDT still stands. *Trichlorphon (Dipterex) is no longer recommended for tortrix control.*

2 — **Use 4 to 6 pints of DDT (18% or 25% EC) in 10 to 15 gallons of water per acre using mistblowers or in 50 to 60 gallons of water per acre using knapsack sprayers.** Use the higher dose of 6 pints for bad attacks and dense bush stands. The spraying must be uniform and thorough, and the spray must be applied all around the bush. The spraying should preferably be carried out when the bushes are dry. Repeat the application after two months, if necessary.

3 — *For spraying small young plants in the nurseries and new clearings,* a standard dilution of **2 to 4 pints of DDT (18% or 25% EC) in 25 gallons of water** is recommended. Spraying should be carried out with knapsack sprayers, using sufficient spray liquid to wet the plants and run-off.

4 — In areas where red spider and scarlet mite attacks are anticipated after DDT spraying, incorporate **10 fl. oz of the acaricide Kelthane** MF into the DDT solution. Tedion V18 (10 fl. oz per acre) may be used as an alternative to Kelthane, but it does not control the Scarlet Mite well.

5 — **The spraying of DDT or the DDT/Kelthane mixture should be done immediately after a plucking round and the next plucking round should be after a safety period of *seven* days. The tea made from sprayed areas must be bulked with ten times as much tea made from unsprayed areas.** If such bulking is not possible, allow a safety period of **fourteen days,** either by discarding one plucking round or by resting the tea. These precautions are necessary in order to keep the DDT residues in made tea, well below the accepted toxic levels.

6 — The usual commonsense precautions must be taken when handling DDT Kelthane and Tedion, even though these are among the safest of pesticides in use today. For detailed safety precautions, see the TRI Entomology Wall Chart (1966).

Costs

The prices of insecticides vary from time to time and according to the quantity purchased. The costs per acre given below are based on the lowest current prices (March/June 1968) of DDT* and Kelthane†. Labour costs are quoted on the basis of Rs 3.25 per day per labourer (including the extra rate for spraying), allowing two labourers per acre for knapsack spraying. For mistblowing, it is assumed that four acres can be treated per day by two men using one machine alternately.

Cost per Acre (Rs)

		Labour		Total	
Treatment	Chemical	Knapsack	Mistblown	Knapsack	Mistblown
DDT 4 pints	7.50	6.50	1.63	14.00	9.13
DDT 6 pints	11.25	6.50	1.63	17.75	12.88
DDT 4 pints+10 fl oz Kelthane	15.31	6.50	1.63	21.81	16.94
DDT 6 pints+10 fl oz Kelthane	19.06	6.50	1.63	25.56	20.69

Summary

1 — Of 19 insecticides evaluated, DDT at the rate of 1.4 to 1.9 lb (six pints 18-25% EC) per acre gave the best control of Tea Tortrix (*Homona, coffearia* Nietner).

2 — A single application of DDT at the dose quoted above was found to be effective for over two months, lasting almost the entire tortrix season.

3 — Trichlorphon (Dipterex) which was recommended earlier for tortrix control has not proved to be as effective as DDT. As mite attacks that may follow DDT spraying can be avoided by incorporating dicofol, (Kelthane) or tetradifon (Tedion) into the DDT solution, the necessity for an alternative to DDT does not immediately arise.

4 — The advantages of carrying out early control measures, at the beginning of an outbreak, are emphasized.

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*DDT 25% @ Rs 15 per imperial gallon

†Kelthane MF @ Rs 125 per imperial gallon

5 — DDT applications did not have any adverse effects on the build up of the tortrix parasite, *Macrocentrus homonae*.

6 — The results obtained with low-volume (mistblown) applications and high-volume (knapsack-sprayer) applications of DDT were equally satisfactory.

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