1986
ANNUAL REPORT
U. S. DEPARTMENT OF AGRICULTURE

ANIMAL AND PLANT HEALTH INSPECTION SERVICE

PLANT PROTECTION AND QUARANTINE

WHITEVILLE METHODS DEVELOPMENT CENTER

IMPORTED FIRE ANT STATION

3505 25TH AVENUE

GULFPORT, MS 39501

1986 ANNUAL REPORT

Imported Fire Ant Station

Whiteville Methods Development Center

Plant Protection and Quarantine Programs

Animal and Plant Health Inspection Service

U. S. Department of Agriculture

Homer L. Collins	Station Leader
Dudley J. Adams	Biological Technician (Retired)
Paul M. Bishop	Biological Technician (Retired)
Avel L. Ladner	Biological Technician
Claude J. Mauffray	Biological Technician (Retired)
Jeannine Levandoski	Secretary

CONTENTS

Project No.	Project Title	Page
	Summary	i
FA01G016	Evaluation of Bait Toxicants	
	A. Fall 1985 Tests	1
	B. Small Plot Trials with LOGIC Formulations and Methods of Application	2
	C. Small Plot Tests with GX - 071	2
FA01G026	Laboratory Evaluation of Alternate Carriers and Formulations	8
FA01G036	Shelf life of LOGIC Oil-Cake Formulation	11
FA02G016	Evaluation of Candidate Potting Soil Toxicants	17
FA02G026	Phytotoxicity Tests with TRIUMPH Incorporated into Potting Soil	22
FA02G036	Dose Rate Trials with TRIUMPH	26
FA02G046	Persistence of TRIUMPH in Various Types of Potting Media	28
FA02G056	Evaluation of Insecticides for Grass Sod Quarantine Treatment	31
FA02G066	Sequential Applications of AMDRO and DURSBAN for Quarantine Treatment of Field Grown Nursery Stock	36
FA05G016	Equipment Testing and Development	
	A. YAARD-VARK Electronic Control Device	43
	B. Manually Operated Bait Dispersal Systems	46
FA07G016	Isolated IFA Infestations in Texas	49

These reports were prepared for the information of the U. S. Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine personnel and others that are interested in imported fire ant control. Statements and observations may be based on preliminary or uncompleted experiments; therefore, the data are not ready for publication or public distribution.

Results of insecticide trials are reported here. Mention of trade names or propriety products does not constitute an endorsement or recommendation for use by the U. S. Department of Agriculture.

SUMMARY

Evaluation of Bait Toxicants (Page 1):

Fall 1985 trials with LOGIC bait applied by aircraft indicated that a novel new formulation known as "oil-cake" was not as effective as the standard pregelled corn formulation. Small plot trials with several baits and methods of application showed that AMDRO applied broadcast plus single mound treatment provided 100% colony mortality in 6 weeks. Other treatments also gave 100% control after 12 weeks. Small plot tests with Griffin GX-071 and AMDRO resulted in 100% colony 8 weeks after an October appliction.

Laboratory Evaluation of Alternate Carriers and Formulations (Page 8):

Neither of two experimental carriers tested were found to be superior to the pregelled corn carrier used in all commercialized bait formulations.

Shelf life of LOGIC Oil-Cake Formulation (Page 11):

Logic oil-cake bait formulation was stored at three different temperatures for 13 months and bioassayed monthly for feeding acceptance. Storage temperatures of 50 degrees Centigrade rendered the bait unacceptable after 5 months, whereas bait stored at room temperature remained attractive for 10 months.

Evaluation of candidate potting soil Toxicants (Page 17):

TRIUMPH, an organophosphate soil insecticide produced by Ciga Geigy provided 11 months residual activity in nursery potting soil in a preliminary trial. These results prompted additional studies with this product.

Phytotoxicity Tests with TRIUMPH Incorporated into Nursery Potting Soil (Page 22):

TRIUMPH was not phytotoxic to 10 different species of woody ornamentals grown in potting soil containing one, two or five times the dose rate which has provided 11-12 months of residual activity against the IFA.

Dose Rate Trials with TRIUMPH (Page 26):

Dose rates of 5.6, 11.2, 22.4 and 44.8 grams AI/cu. yd. are being evaluated for residual activity in potting soil. Results to date are incomplete, but 5.6 grams AI cu. yd. provided 7 months activity. Other rates are effective for 12 months or longer.

Persistence of TRIUMPH 1G in Various Types of Potting Media (Page 28):

Trials are underway to assure that TRIUMPH will provide residual activity in various types of potting media including milled pine bark.

Evaluation of Insecticides for Grass Sod Quarantine Treatments (Page 31):

No candidate evaluated was more effective than the standard DURSBAN 10G formulation, but DURSBAN 50 was similiar in activity.

Sequential Applicators of AMDRO and DURSBAN for Control of IFA in Field Grown Nursery Stock (Page 36):

Combination treatments of AMDRO followed by DURSBAN 10G reduced the IFA population to an acceptable level of risk and has been recommended as a quarantine treatment for field grown nursery stock.

Equipment Testing and Development (Page 43):

The YAARD-VARK (TM) electric fire ant killer was not effective for control of the IFA in both laboratory and field tests.

Several manually operated bait dispersal systems suitable for treatment of small areas such as lawns, parks, etc. were evaluated.

Isolated IFA Infestation in Texas (Page 48):

Several isolated infestations well beyond the "generally infested area" were visited in April 1986. Findings, impressions, and recommendations concerning these infestations were noted.

PROJECT NO.: FA01G016

PROJECT TITLE: Evaluation of Bait Toxicants

Control of imported fire ants through the application of toxic baits is the most cost-effective procedure yet devised. Application of baits can be achieved by the use of specialized ground equipment, by aircraft, or by single mound treatment, depending upon the size of the area to be treated, label restrictions, and other factors. Although several baits are currently registered for use against the IFA, there is a need to continue research and development of improved formulations (carriers, attractants, stabilizers, etc.). Several non-registered chemicals are in various stages of development and require field testing and evaluation. Three field trials with IFA bait toxicants were completed in 1986 and the results reported here.

A. Fall 1985 Tests

In October 1985 field trials were initiated to compare efficacy of LOGIC formulated on pregelled defatted corn (the standard inert carrier) versus an "oil-cake" formulation. Test plots located in grazed permanent pastures located near Monticello, MS, and Bay City, TX were aerially treated on October

3-8, 1985. The aircraft used was a 1977 Cessna Ag-Truck used in all recent field trials. Equipment and operating parameters are described in previous IFA Station Annual reports. The aircraft was operated by Tim Roland, PPQ Aircraft Operations. A third set of plots near Franklinton, LA was treated with ground equipment on October 23 (Table 1). Efficacy of each treatment was determined by procedures described elsewhere (Lofgren and Williams, 1982). As indicated in Table 2, better control was obtained with the pregelled defatted corn formulation.

B. Small plot trials with LOGIC formulations and Methods of Application

Efficacy of several LOGIC formulations and methods of application was determined by treating 1-acre test plots (two replicates/treatment) located near Gulfport, MS on June 22, 1986. Post-treatment ratings were conducted at 4, 6, and 12 weeks after treatment in 1/4-acre efficacy plots located in the center of each treatment plot utilizing procedures described elsewhere. Although several treatments provided 100% colony mortality 12 weeks after application, AMDRO applied broadcast at 1.0 lb. bait per acre plus individual colony treatment at 3 Tbs. bait/colony reached 100% colony mortality in 6 weeks (Table 3).

C. Small plot tests with GX - 071

GX - 071 is an experimental bait toxicant under development by Griffin Corporation, Valdosta, Georgia. Two formulations of GX - 071 plus an AMDRO standard were applied to 3-acre test plots located on the Hattiesburg, MS Municipal airport on October 16, 1986. Each treatment was applied at a bulk rate of 1.5 lbs/acre with a shop-build granular applicator mounted on a farm tractor. As shown in Table 4, 100% colony mortality was obtained with both GX - 071 formulations and the AMDRO standard 8 weeks after treatment.

TABLE 1. SUMMARY OF FALL 1985 FIELD TRIALS WITH IFA BAIT TOXICANTS

TEST SITE LOCATION	PLOT NUMBER	BAIT FORMULATION APPLIED	DATE APPLIED	RATE/ACRE BULK (LBS.)	RATE/ACRE AI (GMS)	ACRES TREATED
Monticello, MS	I	Logic (PGD)	10/03/85	1.0	4.5	150
	II	Logic (oil cake)	10/03/85	1.0	4.5	150
Bay City, TX	I	Logic (oil cake)	10/08/85	1.0	4.5	150
	II	Logic (PGD)	10/08/85	1.0	4.5	150
Franklinton, LA	I	Amdro	10/23/85	1.5	6.0	10
	II	Logic (oil cake)	10/23/85	1.5	6.8	10

TABLE 2. RESULTS OF FALL 1985 FIELD TRIALS WITH BAIT TOXICANTS

TEST SITE LOCATION	BAIT	FORMU-LATION	RATE/ACRE BULK (LB.)	RATE/ACRE AI (GM)	PRETREAT POPULATION 1/ $\bar{X}$ NO. COL. PER PLOT	PRETREAT POPULATION 1/ $\bar{X}$ POP. INDEX	RESULTS - MONTHS AFTER TREATMENT 2/ % COLONY MORTALITY (4)	% COLONY MORTALITY (7)	% COLONY MORTALITY (10)	% CHANGE IN PRETREAT POPULATION INDEX (4)	% CHANGE IN PRETREAT POPULATION INDEX (7)	% CHANGE IN PRETREAT POPULATION INDEX (10)
Monticello, MS	LOGIC	PGD	1.0	4.5	10.6	155	0	31	99.3	-64	-87	-99.9
	LOGIC	Oil Cake	1.0	4.5	10.7	181	0	6	91	-54	-72	-98.8
	CHECK	—	—	—	9.9	168	0	0	.9	+63	+129	+29
Bay City, TX	LOGIC	PGD	1.0	4.5	7.7	157	—	—	74	—	—	-84
	LOGIC	Oil Cake	1.0	4.5	7.8	150	—	—	56	—	—	-69
	CHECK	—	—	—	6.4	122	—	—	22	—	—	+25
Franklinton, LA	LOGIC	Oil Cake	1.5	6.7	16.8	328	10	8	100	-75	-82	-100
	AMDRO	STD	1.5	6.0	18.4	374	59	79	94	-95	-88	-96
	CHECK	—	—	—	14	284	0	1	41	+ 9	+20	-51

1/ Population index based on Lofgren scale (Lofgren & Williams, 1982. Jour. Econ. Ent. 75:798-803).

2/ Posttreatment evaluations at Monticello, MS were made 2, 7 and 9 months after treatment.

TABLE 3. EVALUATION OF VARIOUS LOGIC FORMULATIONS AND METHODS OF APPLICATION

TREATMENT			PRETREATMENT POPULATION AVGS.		RESULTS AT INDICATED POST TREAT INTERVAL (WEEKS)					
					$\bar{X}$% COLONY MORTALITY			$\bar{X}$% CHANGE IN PRETREAT POP. INDEX		
FORMULATION	METHOD OF APPLICATION	RATE OF APPLICATION	COLONIES/ SUBPLOT	POP. INDEX/ SUBPLOT	(4)	(6)	(12)	(4)	(6)	(12)
AMDRO STD.	Broadcast & Single Mound	1.0 lb/A & 3 TBS/Md.	13	272	90	100	100	-97	-100	-100
LOGIC PGD	Broadcast & Single Mound	1.0 lb/A & 3 TBS/Md.	9	190	45	88	100	-92	-99	-100
LOGIC PGD	Broadcast	1.0 lb/A	13	275	46	57	100	-91	-93	-100
AMDRO STD	Broadcast	1.0 lb/A	15	322	86	79	97	-94	-95	- 98
LOGIC OIL CAKE	Broadcast & Single Mound	1.0 lb/A & 3 TBS/Md.	13	270	9	57	96	-87	-94	- 99
LOGIC PGD	Single Mound	3 TBS/Md.	12	272	26	70	91	-88	-96	- 97
LOGIC OIL CAKE	Broadcast	1.0 lb/A	14	287	24	49	83	-87	-93	- 98
LOGIC SA	Broadcast	1.0 lb/A	11	245	18	45	73	-88	-93	- 97
AMDRO STD	Single Mound	3 TBS/Md.	10	202	80	72	61	-88	-93	- 77
UNTREATED CK	—	—	12	267	16	43	50	-45	-55	- 60

TABLE 4. RESULTS WITH GX-071 APPLIED BROADCAST AT 1.5 lb/A 1/

TREATMENT	PRETREATMENT POPULATION		RESULTS - 8 WEEKS POST-TREATMENT	
	COLONIES/ SUBPLOT	POP. INDEX/ SUBPLOT	COLONY MORTALITY	CHANGE IN PRETREATMENT POP. INDEX
AMDRO (STD.)	4.3	75	100	-100
GX-071.02	4.3	67	100	-100
GX-071.03	5.3	87	100	-100
Untreated CK	4.3	68	0	+ 65

1/ 3 acre test plots with 3 ¼-acre efficacy plots within each test plot.

PROJECT NO.: FA01G026

PROJECT TITLE: Laboratory Evaluation of Alternate Carriers and Bait Formulations

Introduction

Inert carriers are essential components in any bait formulation. Milled and sized corn cobs (corn cob grits) was the carrier of choice for use with all mirex formulations. Performance of all non-mirex baits is enhanced when more friable and absorbent carriers are used. Considerable effort has been expended in the search for carriers that are inexpensive, readily available, highly absorbent, friable, flowable, degradable and compatible with existing application equipment. Two small laboratory evaluations of alternate carriers were conducted in 1986:

Test 1

At the request of the Miner-01 company, Warsaw, Ill., bait acceptance tests were conducted on 4 experimental peanut-based formulations. Procedures are described elsewhere in this report (page 12). Although one formulation was accepted by the ants, the texture and sizing of this product would seem to preclude its use an inert carrier for fire ant baits.

Test 2

Feeding acceptance of a "gel" bait formulation submitted by Merck and Co. Inc. was compared with a standard or pregelled corn formulation. Both formulations contained oil-soluable dye so that the dyed food technique described by Bartlett and Lofgren (1961) was used in conjunction with our standard laboratory bioassay for feeding acceptance. Results of the laboratory bioassay indicated that a mean acceptance ratio of .19 was obtained when the gel formulation was used as the candidate and the pregelled corn as the standard. Although the ants were observed feeding upon the gel formulation very little was removed from the feeding arena. Therefore a small field test was conducted on October 27, 1986. Three level tablespoons (18.5grams) of the pregelled corn were uniformly distributed around the base of each of 5 IFA colonies. An equal amount of the gel formulation was also placed on the soil surface around 5 other field colonies. After a 24 hour feeding period the percentage of ants containing dye in each treated colony was determined. Those results showed that an average of 39.4% of the workers offered the pregelled corn bait contained dye whereas 31.4% of the workers offered the gel bait contained dye.

REFERENCES CITED

Bartlett, F. J. and C. S. Lofgren. 1961. Field studies with baits against *Solenopsis saevissima* v. *richteri*, the imported fire ant. Jour. Econ. Ent. 54: 70-73.

PROJECT NO: FA01G036

PROJECT TITLE: Shelf life of LOGIC Oil-Cake Bait Formulation

Introduction

Storage or shelf life of any IFA bait formulation is an important consideration because all baits eventually oxidize and become rancid. Since rancid baits are not actively accepted and fed upon by foraging workers (Lofgren et al 1964), poor control may result from field applications of rancid baits. All commercialized baits contain soybean oil as a feeding attractant, and it is this component of the formulation rather than the inert carrier or active ingredient that becomes unacceptable to foraging workers. The shelf life of a novel bait formulation which did not contain any soybean oil was investigated in the study reported here.

Methods

50 lb. fiber drums containing LOGIC oil-cake bait formulation were divided into 3 groups and stored in the laboratory at ambient conditions (70-74 deg. F.), in a constant temperature chamber at 38 deg. C., and in a second chamber at a constant temperature of 50 deg. C. Samples were removed at

monthly intervals from October 1985 to November 1986 and subjected to the following bioassay procedures:

1. General - A laboratory bioassay for feeding acceptance is a standard test used to determine the relative attractancy of various IFA baits or components of baits. Field-collected captive ant colonies are given a free choice to select and feed on either a candidate bait (the bait under evaluation) or a freshly prepared standard bait. It is assumed that the ants will indicate their preference by consuming greater quantities of the more attractive bait.

2. Collection of ant colonies - Fragments of colonies containing all life forms (workers, immatures, winged sexuals, and occasionally the mated queen) are collected from infested fields by shoveling a portion of the nest tumulus into a plastic dish pan. The colonies are then transported into the laboratory and allowed to acclimate and rebuild the nest structure for 3 - 4 days prior to testing.

3. Preparation of the standard bait - A standard bait known to be attractive to ants is prepared by mixing fresh soybean oil with pregelled defatted corn grits 30% : 70% w/w. The standard bait is prepared one day prior to the test.

4. Candidate bait - The candidate bait is any potentially attractive oil, experimental bait formulation, or formulated bait which may have deteriorated due to storage, etc. Each candidate bait is tested on five different colonies, and the results reported as an average response of all colonies.

5. Bioassay - Four grams of a candidate bait contained in a plastic petri dish are placed on the surface of each of the five test colonies. Simultaneously four grams of the freshly prepared standard bait in an identical container are placed approximately 4 -5 inches from the candidate bait. Foraging workers are then provided a free choice to feed on the bait of their preference. After a 24-hour feeding period, the dishes are removed and the amount of each bait consumed by each test colony is determined by weighing the amount remaining in each petri dish.

6. Computation of acceptance ratio - An acceptance ratio for each candidate bait is computed as follows:

Gm candidate consumed/Gm std consumed = Acceptance Ratio

An acceptance ratio with a value of less than 1.0

indicates that a given candidate is less attractive than the standard. Values equal to or greater than 1.0 indicates that a candidate is equally or more attractive than the standard.

Lofgren et al (1961) reported on the evaluation of 222 different food materials and provided a list of those which gave an acceptance ratio of 0.75 or higher. By convention, this figure has become the minimum ratio recognized as acceptable by most IFA researchers.

Results

As expected, the LOGIC oil-cake formulation was initially lower in acceptance than the fresh soybean oil standard and remained lower throughout the 13 month storage period. Bait stored at 50 deg. C. became questionable after 5 months, whereas bait stored at room temperature remained attractive after 10 months (Table 5). These results indicate that the oil-cake formulation apparently does not have a superior shelf life compared to the more conventional soybean oil bait formulations.

TABLE 5. SHELF LIFE OF LOGIC OIL CAKE FORMULATION

STORAGE TEMPERATURE	$\bar{X}$ ACCEPTANCE RATIO AFTER STORAGE FOR INDICATED TIME (MONTHS) 1/													
	0	1	2	3	4	5	6	7	8	9	10	11	12	13
Laboratory (20-23 deg. C)	.83	.88		.42	.73	.74	.26	.60	.19	.95	.84	.37	.17	.11
38 deg. C (Constant)		.63		.41	.54	.87	.24	.50	.03	.80	.60	.37	.11	0
50 deg. C (Constant)		.45		.25	.68	.95	.22	.48	0	.63	.18	.08	.05	0

1/ Mean based on laboratory bioassays with 5 field collected colonies at each sampling interval. Acceptance ratios computed after a 24-hour feeding period wherein each colony was allowed equal opportunity to feed on the candidate bait (oil cake) versus a freshly prepared standard bait consisting of 30% SBO and pregelled defatted corn. Test initiated 10/17/85.

REFERENCES CITED

Lofgren, C. S., F. J. Bartlett, and C. E. Stringer. 1961. Imported fire ant toxic bait studies: The evaluation of various food materials. J. Econ. Ent. 54:1096-1100.

Lofgren, C. E., F. J. Bartlett, and C. E. Stringer. 1964. The acceptability of some fats and oils as food to imported fire ants. J. Econ.Ent. 75: 601-602.

PROJECT NO. FA02G016

PROJECT TITLE: Evaluation of Potting Soil Toxicants

INTRODUCTION:

Chlordane applied at a rate of 4 ozs. of 5% dust per cubic yard of potting soil was used as a quarantine treatment for containerized nursery stock until cancellation of registration in December 1979. An on-going screening program to evaluate insecticides applied as a pre-plant incorporated treatment for nursery potting soils has been conducted by this laboratory since 1974. The most effective treatment thus far is chlorpyrifos (Collins et al 1980). In January 1980 Dow Chemical Company obtained registration of a 5% chlorpyrifos granule which was marketed under the trade name FA-5. This product was applied at a rate of 0.5 lbs FA-5 per cubic yard of potting media. Several cases of possible FA-5 related phytotoxicity to greenhouse grown succulent plants in Central Florida prompted the registrant to withdraw this product from the market in the Fall of 1981. Registration of a second chlorpyrifos formulation (a 2.5% granule) for treatment of potting soil was obtained in July 1984 by Ford's Chemical and Service, Inc. Pasadena, Texas. At the current time this is the only registered product for this use pattern.

A limited number of candidate potting soil toxicants were evaluated in 1986 in an effort to expand the number of options available to growers who ship containerized plants outside the IFA

regulated area. As in previous years our efforts were impeded by the small number of suitable candidates.

METHODS AND MATERIALS:

Test procedures used to evaluate all candidate toxicants were as follows: Granular or dust formulations of each product tested were blended into nursery potting soil, (Baccto(R), 818 lbs per cu. yd.) at an initial rate of 10 lbs. AI per three-inch acre (equivalent to 11.2 grams AI per cu. yd. of media). A portable cement mixer (2 cu. ft. capacity) was used to blend the toxicants into the potting media, and was operated for one hour per batch to insure thorough blending. Treated media was then poured into one-gallon plastic pots and weathered outdoors under natural conditions for one month prior to the first bioassay.

Bioassays were conducted in the laboratory by confining alate queens to treated soil placed in 2" x 2" plastic flower pots equipped with a Labstone(R) bottom. The labstone absorbed moisture from an underlying bed of damp peat moss. There were four replicates per treatment in each bioassay. Each pot (replicate) contained 20 cc. of treated soil and five alate queens. Queen mortality was assessed after seven days of continuous confinement to the treated soil. Treatments which were effective at the first bioassay interval were aged and retested periodically to measure and

compare residual activity with chlorpyrifos. Several granular formulations of chlorpyrifos have provided over 24 months residual activity when applied at a rate of 11.2 gms AI/cu yd of potting soil.

RESULTS AND DISCUSSION:

Triumph 1G and Dursban 50WP remained active for 11 months (Table 6). Although longer residual activity is desirable, additional studies with Triumph were initiated (See pages 22-30).

TABLE 6 . RESIDUAL ACTIVITY OF CANDIDATE POTTING SOIL TOXICANTS, 1985-86.

Toxicant	Rate ($g.AI/YD^3$)	Mean % of Mortality of Alate Queens Confined to Treated Soil for 7 Days								
		Age of Treated Soil (Months)								
		1	2	3	6	9	10	11	12	16
Triumph 1G 1/	11.2	100	100	100	100	100	100	100	55	20
Dursban 50 WP 1/	11.2	50	66.7	100	100	100	100	100	50	50
Lance 15G	11.2	15	--	5	5					
FMC 67825 20G	11.2	100		65						

1/ Test initiated 4/23/85.

REFERENCES CITED:

Collins, H. L.,C. L. Mangum, J. G. Medley and A. W. Guenther. 1980. Evaluation of soil insecticides for quarantine treatments against imported fire ants, 1976-1979. Insecticide and Acaricide Tests. 5:209.

PROJECT NO: FA02G026

PROJECT TITLE: Phytotoxicity Tests with TRIUMPH Incorporated into Nursery Potting Soil

Introduction

The use of a preplant incorporated granular insecticide is the most advantageous method of providing quarantine certification of container grown nursery stock. At the current time only a single insecticide, Ford's 2.5G Dursban, is registered for this use (Ford's Chemical and Service, Inc., Pasadena, TX). TRIUMPH (formerly CGA-1223) has shown promise as an alternate potting soil treatment (see pages 17-21), this report). In addition to residual activity (12 months minimum), one of the foremost requirements of a potting soil toxicant is that it not be phytotoxic to plants grown in treated soils. A study was initiated on March 19, 1986 to determine possible phytotoxic effects of TRIUMPH on a representative group of 10 species of woody ornamental plants.

Methods

A portable cement mixer was used to thoroughly blend TRIUMPH 1G into potting soil (BACCTO brand, Michigan Peat Co., Houston, TX) at 3 different rates: 11.2, 22.4, and 56 gms AI/cu yd of soil. These rates are 1X, 2X, and 5X the dose rate which

provided 1 year of residual activity in preliminary trials with TRIUMPH. Four plants (replicates) of the following species were transplanted from 2" pots (liners) to 6" pots on March 19, 1986:

Common name	Variety	Sci. Name
Azalea	Coral Bell	Azalea sp
Euonymus	Golden	Euonymus sp
Gardenia	Mystery	Gardenia jasminoides
Holly	Nana	Ilex cornuta burfordi
Magnolia fuscata	Michelia	Magnolia fuscata
Oleander	Hardy red	Nerium oleander
Photinia	--	Photinia frazeri
Pyracantha	Victory	Pyracantha sp
Rhaphiolepis	Enchantress	Rhaphiolepis sp
Sasanqua	Yuletide	Camelia sasanqua

An identical group of plants was also transplanted into pots containing untreated potting soil. All plants were maintained in a shade house on raised benches, watered as needed, and subjected to normal agronomic practices. Phytotoxicity ratings were conducted bi-monthly for 3 months at which time the test was terminated. The phytotoxicity scale used to rate the appearance of each plant was as follows:

(1) Healthy; not different from untreated check

(2) Slight yellowing, wilting, marginal chlorosis or necrosis

(3) Symptoms more severe, some leaf drop

(4) Severe stunting, abnormal leaf or stem structure

(5) Dead

Results

No adverse effects were noted at any dose rate that was evaluated (Table 7).

TABLE 7. PHYTOTOXICITY RATINGS FOR 10 SPECIES OF WOODY ORNAMENTALS GROWN IN POTTING SOIL TREATED WITH VARIOUS RATES OF TRIUMPH 1G.

PLANT	Rating at Indicated Dose Rate and Transplant Interval 1/								
	1 Month			2 Months			3 Months		
	1X	2X	5X	1X	2X	5X	1X	2X	5X
Azalea	1	1	1	1	1	1	1	1	1
Euonymus	1	1	1	1	1	1	1	1	1
Gardenia	1	1	1	1	1	1	1	1	1
Holly	1	1	1	1	1	1	1	1	1
Mag. Fuscata	1	1	1	1	1	1	1	1	1
Oleander	1	1	1	1	1	1	1	1	1
Photinia	1	1	1	1	1	1	1	1	1
Pyracantha	1	1	1	1	1	1	1	1	1
Raphiolepis	1	1	1	1	1	1	1	1	1
Sasanqua	1	1	1	1	1	1	1	1	1

1/ Average ratings for 4 plants (replicates) per dose rate. 1X dose rate = 11.2 gms AI/yd^3 soil.

PROJECT NO.: FA02G036

PROJECT TITLE: Dose Rate Trials with TRIUMPH

Based on previous preliminary results with TRIUMPH (see pages 17-21), additional dose rate studies with TRIUMPH 1G were initiated in January 1986. Dose rates of 5.6, 11.2, 22.4, and 44.8 grams AI per cubic yard of potting media (BACCTO Brand, Michigan Peat Co., Houston, TX) were thoroughly blended into the media with a portable cement mixer. Treated media was then weathered outdoors under natural conditions in 1 gallon plastic pots to simulate actual nursery conditions. Bioassays were periodically conducted according to procedures described elsewhere in this report (page 18).

Results to date are incomplete, but as shown in Table 8, 5.6 grams AI/Cu Yd provided 7 months residual activity. All other rates continued to provide 100% mortality for 12 months, and possibly longer. This trial will be continued until all rates become ineffective.

Table 8. Residual effectiveness of TRIUMPH 1G in Nursery Potting Soil. 1|

DOSE RATE (Gm AI/Cu Yd)	Mean % Mortality to alate queens confined to treated soil. (7 days continuous exposure) Age of treated soil (months) 1	3	7	9	12
5.6	100	100	100	60	55
11.2	100	100	100	100	100
22.4	100	100	100	100	100
44.8	100	100	100	100	100
Check	5	10	10	10	0

1| Test Initiated January 30, 1986.

PROJECT NO.: FA02G046

PROJECT TITLE: Persistence of TRIUMPH 1G Insecticide in Various Types of Potting Media

INTRODUCTION

All available evidence indicates that TRIUMPH 1G may be an effective IFA Quarantine treatment for potting soil. However all trials to date have involved a single type of potting soil (BACCTO) (TM). Since potting soils vary greatly in composition, % organic matter, pH, density, and numerous factors which affects residual activity of insecticides, more information on the performance of TRIUMPH in various mixes is needed in order to support a request for registration.

METHODS AND MATERIALS

The performance of TRIUMPH in two types of potting media will be compared to DURSBAN 2.5G applied at equivalent rates of application (11.2 gms AI/Cubic yard of media). One potting mix consists solely of milled pine bark (Forest Gardens, Inc.; the other is a high vermiculite mix containing bark, vermiculite, peat, and pearlite (Ball Growing Mix, Ball Seed Co.). Each insecticide was blended into the mixes with a portable cement mixer on September 25, 1986 and then weathered outdoors in plastic 1 gallon pots and bioassayed periodically utilizing

procedures described elsewhere (see page 18).

RESULTS AND DISCUSSION

Based on the limited number of bioassays completed to date, both TRIUMPH 1G and DURSBAN 2.5G were highly effective in both types of potting media (Table 9). Bioassays will be continued until activity ceases.

Table 9. Efficacy of Triumph 1G in two different types of nursery potting media.

Type of Media	Insecticidal Treatment	X % Mortality to Alate Queens (7 days Exposure) Age of treated media (months) _1_/ 1	3
Milled pine bark	TRIUMPH 1G, 11.2 Gm AI/cu yd	100	100
"	DURSBAN 2.5G, 11.2 Gm AI/cu yd	100	100
"	Untreated	15	0
Grow-Mix _2_/	TRIUMPH 1G, 11.2 Gm AI/cu yd	100	100
"	DURSBAN 2.5G, 11.2 Gm AI/cu yd	100	100
"	Untreated	35	0

_1_/ Test Initiated September 25, 1986.

_2_/ A high vermiculite media available from Ball Seed Co.

PROJECT NO.: FA02G056

PROJECT TITLE: Evaluation of Insecticides for Grass Sod Quarantine Treatments

INTRODUCTION:

Commercial shipments of ornamental nursery plants and grass sod were associated with accidental introduction of imported fire ants into previously noninfested areas as early as 1953 (Culpepper 1953). Due to their effectiveness and residual activity, chlorinated hydrocarbon insecticides were used as a quarantine treatment to prevent this accidental spread until the U. S. Environmental Protection Agency issued a cancellation order for the use of chlordane for this purpose on March 6, 1978. Efforts by this laboratory to develop alternate treatments have indicated that chlorpyrifos applications will eliminate newly mated or alate queens (but not mature colonies) from grass sod. Registration of a 10% chlorpyrifos granule for this use pattern (4.0 to 6.0 lbs AI/acre) was obtained in July 1984 by Ford's Chemical and Service, Inc., Pasadena, Texas.

It is assumed that the greatest pest risk associated with shipment of grass sod is transport of newly mated queens that may be either on the sod surface or slightly below the surface in the initial brood chamber. This assumption is based on the fact that the likelihood of removing and shipping a mature queen is virtually nil, since vibrations from approaching harvest machinery would cause her to retreat deeply within the mound. Therefore, the intent and

purpose of current insecticide treatments is not to eliminate mature fire ant colonies, but instead to provide mortality to newly mated queens.

Two series of field tests to evaluate several alternate insecticide formulations were conducted in 1985/1986.

METHODS AND MATERIALS:

Test I - Test I was initiated on July 23, 1985 at Pearl River Sod Farm near Wiggins, Mississippi. Each treatment was applied to 10'x 50'plots which contained mature centipede sod. Each treatment was replicated three times. Granular formulations were applied with a Gandy(R) Model 605 granular applicator calibrated to deliver 5.0 lbs AI/acre. The Dursban 50W formulation was applied with a tractor mounted PTO-driven sprayer calibrated to deliver 50 gallons of finished spray per acre at 30 PSI. Six whirljet nozzles (BSS-3) spaced 20" apart on a 10'boom were utilized. Due to the difficulty in obtaining large numbers of newly mated queens, the more easily collected unmated queens (female alates) were utilized to bioassay the effectiveness of each insecticide. The following treatments were evaluated:

INSECTICIDE	MANUFACTURER	FORMULATION	RATE/ACRE (LBS. AI)
Amaze	Mobay	5 G	5.0
Dursban	Dow	50 WP	5.0
Dursban	Ford's	10 G	5.0
Marshall	FMC	5 G	5.0
Mocap	Rhone-Poulenc	5 G	5.0
Triumph	Ciba-Geigy	1 G	5.0
Triumph	Ciba-Geigy	1 G	2.0
Untreated Ck.	-	-	-

Residual activity of each product was determined in the following manner: A wheel-type soil sampler was used to collect and composite approximately 300 soil cores (.5" x 2.0") from each plot at various intervals following treatment. Samples were passed through a 1/4" mesh sieve to remove grass, rhizomes and other debris from the soil. Each composited soil sample was then bioassayed with alate queens. Bioassays were conducted in the laboratory by confining alate queens to treated soil which was placed in 2" x 2" plastic flower pots equipped with a Labstone(R) bottom. The Labstone absorbed moisture from an underlying bed of damp peat moss, while a Fluon(R) coating and a screen mesh lid prevented the ants from escaping from the top of the open pots. Each pot (replicate) contained 20 cc. of treated soil and 5 alate queens. There were 4 replicates/treatment/sampling date. Queen mortality was assessed after 7 days continuous exposure to treated soils.

Test II - Test II was initiated on Aprl 16, 1986 and was also conducted at the Pearl River Sod Farm. Test plots

were 20' x 50' and were comprised of mature centipede sod. Irrigation water was not applied, but approximately 1.0 cm of rainfall was received during the first 24 hours post-treatment.

Treatments applied in Test II were as follows:

INSECTICIDE	MANUFACTURER	FORMULATION	RATE/ACRE(LBS. AI)
Bendiocarb	Nor-Am	2.5G	5.0
Diazinon	Ciba-Geigy	50 WP	10.0
Dursban	Ford's	10 G	5.0
Dursban	Dow	50 WP	5.0
Check	-	-	-

Results

The most effective treatment in terms of residual activity in both trials was Dursban 10G (Table 10). As previously stated, this is the standard and only registered treatment available for this use.

TABLE 10. RESIDUAL EFFECTIVENESS OF VARIOUS INSECTICIDES FOR CONTROL OF ALATE QUEENS IN GRASS SOD

TREATMENT	RATE/ACRE (Lbs. AI)		$\bar{X}$% MORTALITY OF ALATE QUEENS CONFINED TO SOIL COLLECTED AT INDICATED POST-TREAT INTERVAL 1/									
			1 WK	1 MO	2 MO	3 MO	4 MO	6 MO	7 MO	8 MO	9 MO	10 MO
TEST 1 (JULY 23, 1985)												
DURSBAN	10G	5.0	100	100	95	96	100	100	100	100	90	13
DURSBAN	50W	5.0	85	100	93	62	97	100	100	100	45	10
TRIUMPH	1G	5.0	100	100	0	3	0					
MARSHALL	5G	5.0	45	92	0	0	0					
AMAZE	5G	5.0	100	85	10	0	0					
MOCAP	5G	5.0	45	83	0	20	0					
TRIUMPH	1G	2.0	85	9	42	3	3					
CHECK	--	--	0	0	0	0	0	5	10	5	10	0
TEST 2 (APRIL 16, 1986)												
DURSBAN	10G	5.0	100	47	100	87	12					
DURSBAN	50W	5.0	100	7	8	17	13					
DIAZINON	50W	10.0	100	7	2	20	15					
BENDIOCARB	2.5G	5.0	45	5	0	20	5					
UNTREATED CHECK		--	10	0	5	15	5					

1/ Bioassay based on 4 replicates/test plot with 5 alate queens/replicate. 7 days continuous exposure to treated soil.

PROJECT NO.: FA02G066

PROJECT TITLE: Sequential Applications of Amdro and Dursban for the Control of Fire Ants in Field Grown Nursery Stock

Introduction:

One of the most pressing problems facing the Federal imported fire ant quarantine program is the lack of an acceptable procedure for certification of field-grown nursery stock. Current regulations (PPQ Manual M301.81) state that balled and burlapped nursery plants must be treated with a chlorpyrifos solution either as a dip or a pour-on prior to shipment outside the IFA regulated 'area. These procedures are highly incompatible with normal nursery practices due to the cost and labor involved.

The most desirable treatment would be one that could be applied to plants in the field, (i.e., preharvest), and is compatible with most nursery operations, relatively inexpensive and effective. Any treatment that falls short in any of the above criteria would result in reduced compliance, thereby reducing the effectiveness of the program.

The purpose of this research was to test under actual field conditions a simple procedure that would be acceptable to both growers and regulatory officials. This procedure is based on a sequential application of Amdro followed in 7 to 10 days by Dursban. The dual application is necessary since broadcast applications of Dursban (or other short term residual insecticides) usually do not eliminate large mature IFA colonies, and no bait including Amdro is

capable of providing a residual barrier against reinfestation by new queens. Therefore, the treatment is based on the hypothesis that Amdro would drastically reduce the population while Dursban, applied approximately 7 days later, would destroy any remaining weakened colonies and leave a residual barrier against reinfestation.

Materials and Methods:

1985 Tests:

Four separate tests were conducted in the spring, summer and fall of 1985 to evaluate this procedure. In all tests, Amdro was applied at 1.5 lb. per acre with a modified Gandy (R) applicator. Dursban 10 G was applied at 6.0 lb. AI per acre with a Skibbee spreader. In both cases, the spreaders were mounted to a Ford 1700 tractor travelling at 4 mph.

At each evaluation period, each plot was rated according to the population index system (Lofgren and Williams, 1982). In addition, 20 bait stations (peanut butter on tongue depressors) were randomly placed in each plot. Bait stations were evaluated as being either positive or negative for foraging IFA workers 1 hour after being placed on the soil surface.

Results:

Test 1: Stennis Airport, Bay St. Louis, Mississippi.
May 23, May 30, 1985.

Population Index at Indicated No. of Weeks Post-Treatment

Treatment	Pretreat	4	8	15	19
Amdro + Dursban 10G	135	0	0	0	0
Check	71.5	76.6	43.3	48	61.6

Treatment	% of Bait Stations with Ants				
	Pretreat	4 Wks	8 Wks	15 Wks	19 Wks
Amdro + Dursban 10G	100	45	0	0	15
Check	100	45	100	95	75

Test 2: V. E. Howell Nursery, Lucedale, Mississippi.
April 11, April 17, 1985

Population Index at Indicated No. of Weeks Post-Treatment

Treatment	Pretreat	1	8	12	16	20	24
Amdro + Dursban 10G	1802	670	10	0	4	98	350
Amdro	926	684	275	130	181	360	625
Check	807	446	305	287	349	180	593

Treatment	% of Bait Stations with Ants						
	Pretreat	1 Wk	8 Wks	12 Wks	16 Wks	20 Wks	24 Wks
Amdro + Dursban 10G	95	0	15	25	5	45	95
Amdro	95	5	100	85	95	70	100
Check	95	95	100	100	100	60	100

Test 3: Pascagoula Airport, Pascagoula, Mississippi.
August 29, September 10, 1985

Treatment	Population Index at Indicated No. of Weeks Post-Treatment			
	Pretreat	4	8	12
Amdro	135	43	22	1/
Amdro + Dursban 10G	185	0	0	
Dursban 10G	80	3	0	
Check	115	132	110	

Treatment	% of Bait Stations with Ants			
	Pretreat	4 Wks	8 Wks	12Wks
Amdro	100	5	40	
Amdro + Dursban 10G	100	0	0	1/
Dursban 10G	100	0	0	
Check	100	100	100	

1/ Lost plots due to insecticidal treatment by Airport Authority

Test 4: Windmill Nursery, Folsom, Louisiana.
October 22, October 29, 1985.

	Population Index at Indicated No. of Weeks Post-Treatment			
Treatment	Pretreat	4 Wks	12 Wks	24Wks
Amdro	250	90	55	13
Amdro + Dursban 10G	185	2	15	0
Dursban 10G	270	68	9	62
Check	385	372	272	410

	% of Bait Stations with Ants			
Treatment	Pretreat	4 Wks	12 Wks	24 Wks
Amdro	60	30	20	0
Amdro + Dursban 10G	90	0	0	0
Dursban 10G	90	0	0	0
Check	95	70	80	40

1986 Tests:

Test plots were established at Windmill Nursery, Folsom Louisiana and treatments applied on May 12-14, 1986. Due to an extereme drought in this area, a total population collapse occurred and the test was abandoned.

Discussion:

Results of all tests completed in this study indicate that the combination treatment of Amdro followed by Dursban 10G gave effective control of imported fire ants. Essentially 100% control was achieved in all trials during the period from 4 to 16 weeks post-treatment.

While it does appear that the control period will vary from site to site (possibly dependent upon local climatic conditions, time of mating flights and numerous other factors), a 12 to 16-week certification period can be achieved with this procedure.

REFERENCES CITED

Lofgren, C. S. and D. F. Williams. 1982. Avermectin Bla, a highly potent inhibitor of reproduction by queens of the red imported fire ant. Jour. Econ Ent. 75: 798-803.

PROJECT NO: FA05G016

PROJECT TITLE: Equipment Testing and Development

A: YAARD-VARK (TM) Electric Fire Ant Killer

Introduction:

An electronic device marketed under the trade name "YAARD-VARK" was purchased locally at a retail cost of $49.50 per unit in June 1986. YAARD-VARK(TM) is produced by Fi-Shock Inc., 5360 National Drive, Knoxville, TN. The device operates on 110-120 volt 60 cycle AC, and purportedly produces an electromagnetic field which alters the behavior of the IFA so that the workers attack one another. Some ants are electrocuted when they contact an exposed electric coil on the lower part of the unit.

Laboratory Tests

A preliminary laboratory evaluation was initiated June 10-12, 1986. Three field collected IFA colonies and associated nest tumulus were confined in 3-gallon plastic pails and returned to the laboratory. The YAARD-VARK unit was inserted into each colony and operated continuously for 6 hours. A ring of electrocuted workers (estimated 200-500/colony) was observed in each colony at the end of the treatment period. All colonies were maintained in the

laboratory and observed daily for 2 weeks. Except for the relatively small number of electrocuted workers, all colonies appeared normal at the termination of the two week observation period.

Field Tests

Since the test arena used in the laboratory tests confined the IFA colonies and prevented colony relocation or movement, a field trial to more closely simulate a homeowner-type treatment was initiated on August 13, 1986. The unit was inserted into the apex of an active field colony (10-inch diameter mound) and operated for 3 hours (colony #1). At the end of the 3 hour treatment period several hundred workers were observed milling about in an apparent state of confusion. Some workers (estimated 200-300) appeared dead due to electrocution. Within 20 minutes the milling workers retreated within the mound, leaving a 2 cm ring of dead workers around the site where the YAARD-VARK probe was inserted. On August 14 the colony was still active and the probe was reinserted and operated for 3 additional hours. On August 15 the colony relocated 8' from the treated mound and remained in the new mound (nest) for the next 5 days. The unit was operated on a second colony (colony #2) for 3 hours on August 13. This colony relocated to a new

nest 10' from the treated mound on August 14. Colony #3 was treated for 3 hours on August 14, and remained active and in place on August 15, but relocated on August 16. All relocated colonies were active and normal in behavior and caste composition.

A second trial utilizing the dyed-food technique to confirm that treated colonies were simply relocating (rather than new colonies moving into "treated" areas) was initiated on August 26. Thirty grams of dyed bait (.25% calico oil dye) was distributed in a 3' radius around each of 3 previously untreated colonies. Foraging workers were internally marked by consuming this dyed bait which was readily apparent when workers were crushed between two pieces of white paper (Bartlett and Lofgren 1961). Each "internally marked" colony was subjected to a 3 hour treatment with the YAARD-VARK device on August 27. Colony #1 had moved (relocated) 8' from the treated mound on August 28. Ants from the "new" nest contained red dye indicating that had indeed simply vacated the treated mound. Colony #2 relocated 4' from the treated mound, and colony #3 remained in the treated mound. Observations made on September 12 (16 days after treatment) indicated that colony #1 had moved back into the original or treated mound with no change in location for either colony #2 or #3. All colonies were active and normal

in all respects and the trial was terminated on this date.

Discussion:

From these studies we concluded that this electronic device is of little value for control of imported fire ants.

B. Manually Operated Bait Dispersal Systems

Due to the problem of detecting and treating individual IFA colonies (especially small colonies or those in heavy vegetation), broadcast applications of bait is the preferred method of treatment for both large and small areas. Mechanized application equipment is available for treatment of larger areas by both aircraft and ground equipment. Several manually operated or "low-tech" applications, suitable for use by individuals to treat smaller areas such as lawns, parks, playgrounds, etc. are characterized in Table 11.

Table 11. Comparison of Manually Operated Bait Spreaders

Bait Spreader	Available From	Type Action	Approximate Swath width (Ft.)	Approximate Retail Price ($)
Ortho Whirly Bird	Chevron Chemical Co., San Francisco, CA	Spinning Disc	12	10.50
B & G Model 1170 Dispenser	Terminix, International Memphis, TN	Compressed Air	8	34.20
Acme Spred-Rite	PBI Gordon Corp. Kansas City, KA	Gravity Flow	6-8	12.00

REFERENCES CITED

Bartlett, F. J. and C. S. Lofgren. 1961. Field Studies with baits against *Solenopsis saevissima* v. *richteri*, the imported fire ant. Jour. Econ. Ent. 54: 70-73.

PROJECT NO.: FA07G016

PROJECT TITLE: ISOLATED IFA INFESTATIONS IN TEXAS

At the request of the Texas Department of Agriculture, several isolated infestations in Texas were visited in April, 1986. A detailed summation of the findings, impressions, and recommendations which resulted from that trip are summarized in Appendix I.

APPENDIX I

ISOLATED IFA INFESTATIONS IN TEXAS

Stephenville, TX

4/29/86

Stephenville (pop. 14,000) is a farming community located approximately 60 miles southwest of Fort Worth, or about 60 miles beyond the "generally infested area". This area receives 20-25 inches of rainfall per year. The first site visited was at an equipment salvage firm (formerly a construction company) at the junction of state roads 108 and 8. A livestock sale barn was located next to the salvage firm. Numerous IFA mounds were seen on both properties and were well dispersed over a several acre area. Most mounds were typical monogynous mature colonies (large, well worked as seen in other areas). Sex brood and alates were abundant. No irrigation of any type was used at this site. The next site visited was in the 700 Block of N. Paddock street. Mounds were seen in lawns, along roadways, alleys and for several hundred yards along a railroad track. Collections were made and preserved in hexane for taxonomic confirmation and for cuticular hydrocarbon analysis by Dr. Bob VanDemeer (ARS, Gainesville, FL). Again presence of large mature colonies containing reproductive forms indicated that the infestation was well established and had been in this location for a year or more. There was no evidence that the ants were selectively utilizing irrigated areas or passive solar devices such as buildings, walls or asphalt areas. An extensive survey of the entire town was not done; thus the full extent of the infestation was not determined. However based on the number of colonies seen and the wide area over which they were dispersed it was readily apparent that the infestation could not be treated on an individual mound basis.

Eastland, TX

4/29/86

The next town visited was Eastland, which is located approximately 80 miles west of Fort Worth, and approximately 100 miles from the periphery of the generally infested area. Three sites were known to be infested: (1) the Daughtery Road infestation was comprised of a 2-acre mesquite/prickley pear cactus field along with an adjacent roadway embankment approximately 40 feet X 300 yards; (2) a retail nursery and environs on Commerce Street; (3) Several properties and roadside along Commerce Street from the intersection of Virginia street eastward to the Church. These three sites were estimated to be 1.5 to 2.0 miles apart. A cursory examination of adjacent areas

indicated that each population was well contained, i.e, "Clustered" in a relatively small area. Mounds were relatively abundant within each site but rapidly became scarce or non-existant as the edge of the "cluster" was approached. A very extensive public awareness program had been conducted by the County Extension Agent, Mr. DeMarquis Gordon and it was assumed that no other sites within Eastland were infested. Due to the localized nature of these populations Dr. Ann Sorenson, IPM Specialist, TDA and I agreed that a suppression program based on AMDRO in combination with a DURSBAN drench would be in order from a logistical viewpoint at least. A broadcast application of AMDRO was applied with handseeders (ORTHO "Whirlybird" Spreaders) at each site and surrounding areas on April 30. A "Mop-up" treatment with DURSBAN (1 fl oz 2E/2 gals water/mound) was applied on May 2. A total of 300 gals of finished solution was applied on this date.

Abilene, TX.
4/30/86

After applying the AMDRO treatment to the Eastland sites we traveled to Abilene, arriving around noon. Abilene is approximately 150 miles beyond the generally infested area. We were met there by TDA inspectors Billy Henderson and David Davis. Approximately 10 sites (mostly in the south half of town) had been previously identified as IFA infested. These sites were reported to TDA and/or the Extension Service by the public; a comprehensive survey of the entire city has not been done. We visited 5 sites; our observations are as follows:

Site 1(#6 on TDA infestation map)

The first site visited was located near Lake Kirby and appeared to have been part of the lake bed at one time (several years ago). The site was remote from any human habitation and was comprised of a 3 to 5 acre open field. The primary vegetation was Bermuda grass. Large mature mounds (we estimated 25-50) containing alates and sex forms were "clustered" in the 3 to 5 acre field. Cursory examination of surrounding areas indicated that the population was confined to this area and not generally dispersed over a larger area. Although the lake could be seen in the distance, no ground water was near this site and no irrigation had ever been used here. Lake Kirby is very shallow and may have been larger in previous years. Although we can only speculate this population may have "rafted" to this site some time ago. However it was obvious by the size of colonies and the caste composition that this was a mature and well established population. Due to the size of the area we elected not to apply AMDRO with the hand seeders since the use of mechanized equipment would be more appropriate.

Site 2

The next site visited was a private boat launch area of Lake Lytle which is maintained by West Texas Utilities. Ant colonies in abundance (more than 50) were seen along a private road leading to the launch area, in a grassy area near the launch, and in private lawns along the way. Large wooden signs were posted warning visitors that the area is "Fire Ant Infested". Residents stated that in 1981 the lake flooded this area and ants first appeared after the water receded (rafting again?). However, one resident is a retired landscape architect and may have maintained a variety of nursery landscape plants in her backyard at one time since pots, greenhouse, etc. are still present. We applied a "cosmetic treatment" of AMDRO with hand seeders. The maintenance chief for the lake related that the entire lake shore (lake estimated to be 80-100 acres) was infested. We did not confirm this due to time restraints.

Site 3 (#5 on TDA map)

The third site visited was a mobile home park off S. Pioneer Street (Westgate Mobile Homes). More than 50 mounds were seen along a chain link fence separating the mobile homes from an adjacent vacant field. Although lawns were irrigated to a certain extent, the ants were mostly located along the fence which received little or no water. This was a mature population very similar to the others seen in other parts of town.

Site 4 (# 8 on TDA map)

The next site was along an alley behind another mobile home park of SR 277. Over 25 colonies were utilizing non-irrigated roadsides along both sides of an alley.

Site 5

The last site visited in Abilene was a golf course. More than 25 mounds were observed along paved golf cart trails, greens and non-irrigated roughs. In general, these colonies were smaller than others seen, but an insecticidal program was being conducted by the grounds manager.

General Overall Impression of the Abilene Infestation:

The IFA is well established in Abilene. Although the entire town appears not to be generally infested, "clustered" populations are thriving at many sites over at least a 6 mile area. Less than 2" of rain has fallen since January, but the colonies appear to be well maintained and contain an abundance of brood. We saw no obvious utilization of heat-enhancing structures (i.e. passive solar devices such as stone walls, street curbs, etc.). This factor, in combination with frequent infestation of "dry-land" areas suggest that adaptation to local climatic conditions may have occurred.

San Angelo, TX
5/1/86

San Angelo is located approximately 120 miles from the generally infested area. According to TDA Inspector Dale Burnett, the first IFA infestation in San Angelo was detected in landscape islands of a large shopping mall in 1981. At least six additional infested sites scattered over a 5 mile area are now known. We visited several of these sites; our findings were as follows:

Site 1 (Sunset Apartment Complex)

Sunset Apartments is a relavtively new, well landscaped and maintained complex estimated to be 20-30 acres in size. We found 4 small colonies after approximately 4 man-hours of survey. All colonies were small and inconspicuous; no alates were seen. Frequent AMDRO and DURSBAN applications have been made by the manager as well as TDA inspectors. All colonies were in irrigated lawn areas and were usually adjacent to sidewalks or street curbs.

Site 2 (Southwest Bank)

Approximately 12 colonies located in irrigated St. Augustine grass on Southwest Bank property; small colonies mostly adjacent to street curbs. This infestation, not previously reported, was first observed by D. J. Adams. Wing forms were not observed but brood was abundant. No history of insecticide treatment at this site. The infestation was localized in an area between street and paved area; probably less than 1000 sq. ft. total.

Site 3 (Plaza Square Apartments)

30 to 50 colonies were seen in about 1/2 hour. Most colonies were located adjacent to sidewalks or paved areas in irrigated lawn areas. All mounds were typically small, flat and not built up. No mounds were seen in open areas only a few feet away from pavement. Male alates found in one colony. According to the maintenance manager AMDRO and DURSBAN have been used to treat the complex for over 2 years. Broadcast applications have not been made, but individual colonies have been treated as they were observed.

Site 4 (Shopping Mall)

A "windshield survey" of the Mall where the original mound was reported by a retired PPQ inspector was made. No mounds were seen this date; however extensive treatment of all landscape islands in the parking area has occurred.

Site 5 (McDonalds across from Mall)

Two small colonies typical to those found in the apartment complex were found in association with sidewalks. Previous history of AMDRO treatment to this property.

Site 6 (Bunyard Construction Co. 4382 SW Blvd.)

Four large mature colonies (25 on the population index scale) were seen at the above address. These colonies were atypical of all others seen in San Angelo due to their size and location. Although they were in an irrigated St. Augustine lawn,

they were not adjacent to sidewalks, etc. Alates were present and brood was abundant.

General Overall Impression of the San Angelo Infestation:

The San Angelo infestation appears to be quite different from the Abilene, Eastland, or Stephenville infestations. The use of passive solar devices and irrigated lawns for nest site selection seems to more closely fit the previously assumed pattern of infestation for these climatic conditions. Sidewalks, street curbs and other paved or asphalted areas may not only serve as passive solar heat devices, but also provide a mechanism for conservation of moisture.

RECOMMENDATIONS:

1. Prior to giving further consideration to any type of abatement or suppression program a thorough and complete survey in conjunction with a highly publicized public awareness program should be conducted. This should also be done in other towns such as Midland, Odessa, Pecos, Sweet Water, etc.

2. Based on the survey, conduct control/suppression/eradication programs as appropriate, i.e.,"low-tech" methods such as hand-seeder application of baits followed by DURSBAN drenches may remain a viable option for San Angelo and Eastland, but multiple aerial applications of baits are needed for Abilene. Current label restrictions preclude aerial application to Abilene, but perhaps a Specific Exemption or other authorization could be obtained.

3. A follow-up evaluation of the Eastland treatment should be made 4-6 weeks after application and again 2-3 months later. Colonies detected during the evaluations and those reported by the public (if any) should be retreated with a DURSBAN drench.

4. Due to the apparent differences in the San Angelo vs. Abilene populations, an unusual and excellent opportunity for research on ecology and adaptive factors exists. Research organizations should be encouraged to pursue this opportunity.

CITY	ANNUAL PRECIPITATION (IN.) 1/	ELEVATION (FT.) 2/	TEMP. (0 F.) 1/ JAN. MEAN	TEMP. (0 F.) 1/ MIN	DISTANCE FROM GENERAL INFESTED AREA (MI.) 3/
EASTLAND, TX	26.3	1468	43.7	-5	100
STEPHENVILLE, TX	29.8	1318	45.7	-9	60
ABILENE, TX	24.8	1789	45	-6	150
SAN ANGELO, TX	21.6	1915	46.3	1	120
BILOXI, MS	58.7	34	53.7	1	--

Reference Sources:

1/ Yearbook of Agriculture, 1941
2/ Texas Aeronautics Commission
3/ Mark Trostle, IFA Specialist, Texas Department Agriculture