Tox

Shaugh. No. 122101

EAB Log Out Date: 03 JUL 1984

Init.: SM

323EE

To: H. Jacoby
Product Manager 21
Registration Division (TS-767)

From: Carolyn K. Offutt
Head, Environmental Processes and Guidelines Section
Exposure Assessment Branch, HED (TS-769)

Attached, please find the estimated environmental concentration review of:

Reg./File No.:

Chemical:

Type Product: Fungicide

Product Name: TILT

Company Name: Ciba-Geigy

Submission Purposes: EEC on Pecans

ZBB Code: other

Action Code: 330

Date In: 18 April 1984

EFB#: 4294

Date Completed:

TAIS (Level II)	Days
61	3.0

Deferrals To:

XX Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

CGA-64250 (TILT)

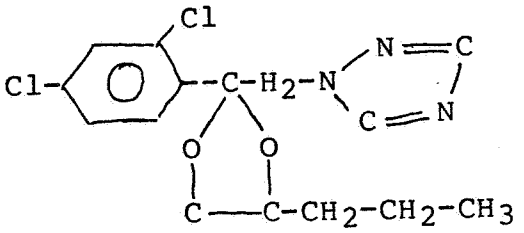
I. Introduction:

Ecological Effects Branch on 28 March 1984 requested that an estimated environmental concentration be determined for aquatic environments where TILT (CGA-64250) will be sprayed on pecans to control certain fungal diseases.

II. Chemical/Physical Properties:

Common Name: CGA-64250 (TILT)
Chemcial Name: 1-(2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl)methyl)-1H-1,2,4-triazole

Structure:



See attached "EAB One-Liner" for additional information.

III. Use Directions:

TILT is used for the control of pecan scab, downy spot, brown leaf spot, liver spot, vein spot, Zonate leaf spot and fungal leaf scorch in a regular spray porgram beginning at prepollination when leaves are unfolding. Continue applications while small nuts are forming, and repeat thereafter at 2-4 week intervals as needed, not exceeding six applications per growing season. Do not apply after shuck-split. For trees over 30 feet tall, use 8 to 12 fl. oz. TILT per acre; for trees under 30 feet, use 6 to 9 fl. oz. TILT per acre. Rates are varietal specific. For non-bearing pecans apply 4.0 to 5.5 fl.oz. per acre beginning as young leaves unfold and repeat at 2-4 week intervals.

IV. Estimated Environmental Concentration Assessment:

A detailed EEC was performed using three environmental fate models: Simulator for Water Runoff in Rural Basins (SWRRB); Exposure Analysis MOdeling System (EXAMS); and Spray Drift Model (Holst - Ballistic).

TILT is applied at a maximum rate of 12 fl.oz/acre or 0.36 lb. ai./acre (3.6 lbs a.i./gal).

The estimated environmental concentration was determined for pecans grown in Georgia. The watershed from the SWRRB model system was chosen and modified to reflect pecans grown on those sites. The site, Tifton GA (TIFTON), had been modified to reflect grass or turf growth with a root depth of 8 inches.

The leaf area index (LAI) was changed accordingly to reflect the LAI for pecan trees:

TIFTON	
DAY	LAI
1	0.100
70	0.100
100	2.000
290	2.000
320	0.100
366	0.100

The pesticide information for the model is given in Table 2. The application dates and rates are given in Table 3.

The pesticide was applied six times during the growing season during non-rainy periods. The maximum quantity of pesticide leaving the field was 0.072 lb/acre (1972 day 177) (Table 3). The greatest annual quantity that was transported from the Tifton grove was 0.173 lb/acre for 1970. The pesticide runoff was associated primarily with runoff events where the peak runoff rate exceeded 0.1 cfs combined with a total runoff greater than 0.1 inches. It should be noted that the Tifton site is a small field: 0.85 acres. Where a large grove is likely to be present and numerous small watersheds directly feed one pond, the runoff input to that pond will be the sum of runoffs from the grove. This assumption was followed in this estimation of runoff input.

The 1970 SWRRB runoff quantities were inputted to EXAMS using a pond scenario whose environmental data has been modified to reflect the Tifton GA area (Table 4 data input). A total of 1.02 kg runoff input (during a four day period in 1970) as from a ten hectare field was used for the loading of the one hectare pond. The hydrologic data was not changed from that found in the AERL pond scenerio. EXAMS predicted about 50 ppb material to be present in the pond (Table 5 and Figure 1).

The quantity of material that drifted from the pond was estimated by use of a ballistic drift model. Using two nozzle types that could be used in this type of application, the quantity of driftable material is about 0.02 to 0.04 lb. ai./ acre (Table 6). This would be equal to about 50 ppb in six inches of water or about 5 ppb in 2 meters of the pond at a distance of 300 feet. As noted in the figure comparing drift versus runoff inputs (Figure 2), the area for potential drift input is about 10% or less of the total input into the pond. (Not all of the field's drift will move to the pond.) Because of this small input relative to runoff, it was not entered into the EXAMS input. However, the estimate given above for water quantity (50 ppb) does include enough deviation to account for the drift input.

V. Conclusions:

The quantity that may be found in a pond may reach 50 ppb when both runoff and drift occur due to windy application days (10 mph) and rains that occur shortly after application of the material.

Robert W. Holst, Ph.D.
Plant Physiologist
Exposure Assessment Branch
Hazard Evaluation Division

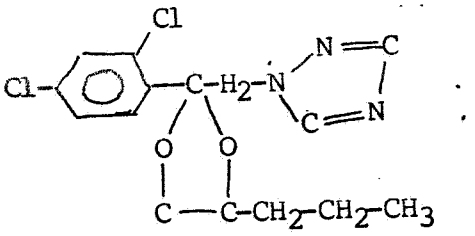
Date 21 MAY 84

EXPOSURE ASSESSMENT BRANCH ONE LINER

EAB File No: 122101 TYPE PESTICIDE: Fungicide STRUCTURE

COMMON NAME: CGA-64250

CHEMICAL NAME: 1-(2-(2,4-dichlorophenyl)-4-propyl-1,3-dioxolan-2-yl)methyl)-1H-1,2,4-triazole



Formulation Types:

Degradation Products:

CHEMICAL AND PHYSICAL PROPERTIES

Mole. Wt.	Aqueous Solubility	Vapor Pressure	K_{ow}	Henry's
343(calc.)	110 (ppm) (°)	3×10^{-6} torr (20°)		(atm/mol/m^3)

Soil Adsorption Coefficient

Soil Type	pH	% Soil O.M.	Kd	K_{om}	K_{oc}
loamy sand	7.8	2.2	8.48	385	
sand	6.3	1.2	10.96	913	
silty loam	6.1	3.6	26.20	728	
sandy clay loam	6.7	5.6	59.03	1054	

Soil Column Leach. Stdy.	Soil TLC R_f
Loamy sand <5% Sand	
9.2% Silty loam	
<5% Sandy clay loam	
<5%	

Hydrolysis

pH	Temp.	$T^1/_2$
5	70C	>>>28dy
7	70C	>>>28dy
9	70C	>>>28dy

Photolysis

pH		$T^1/_2$
Air:		
Soil: wet or dry	pH 6.1	>>10dy
Water:		

Mobility Class

(1) Immobile
(2) Low
(3) Low to Mod.
(4) Moderate
(5) Mobile

Degradation - Laboratory Half-life

		$T^1/_2$		$T^1/_2$
Soil Aerobic:	Silt loam pH 7.6 OC 2.7%	60-86dy	Soil Anaerobic:	Swiss >12 wk
Aquatic Aerobic:			Aquatic Anaerobic:	

EAB Chemical One-Li.
Chemical CGA-64250

Degradation - Field Half-life

		$T^1/_2$		$T^1/_2$
Soil Aerobic:	MS silt loam pH 7.1 OM 1.7%	>300 dy	Soil Anaerobic:	
	MS silt clay loam pH 7.2 OM 1.2%	152 dy		
	TX sandy loam pH 7.2 OM 0.6%	96-170 dy		
	GA loamy sand pH 6.7 OM 0.5%	104-107 dy	Aquatic Anaerobic:	
Aquatic Aerobic:				

ENVIRONMENTAL EXPOSURE

Found in Ground Water (Y/N)?_____

Site(s) _____ Level:_____

Reentry Innterval Established?_____

Rotational Crop Restrictions: _____

Fish Bioaccumulation Factors

Species	Tissue Edible	Tissue Viscera	Whole Fish	Duration (Half-life)
Bluegill	24 X	138-516X	68-203X	7 dy
	X	X	X	
	X	X	X	

EXPOSURE ASSESSMENT:

Degradation Summary:

Due to its moderate adsorption to most soils, CGA-64250 will not have a tendency to leach.

It does accumulate in fish but can be metabolized or excreted readily.

The chemical slowly degrades by microbial activity. It does not degrade by hydrolysis or photolysis.

REFERENCES: EAB Reviews

One-Liner Writer: R.W. HOLST

Table 2. SWRRB Input Parameters for Tifton GA Pecan Grove

Adsorption Coefficient (Kd)	=	15.0
Foliar Half-life	=	200.0 days
Soil Decay Constant	=	0.0063 /day
Application Efficiency	=	0.50 (50%)
Initial Pesticide on Foliage	=	0.0 lb/acre
Initial Pesticide on Soil	=	0.0 lb/acre
Enrichment Ratio	=	1.5

Table 3. SWRRB Application and Runoff Data for Tifton Pecan Grove

Date (Julian)	Application (lb/acre)	Runoff (lb/acre)	Total Runoff (lb/acre/yr)
1970			
91	.36		
111	.36		
130	.36		
146		.006	
148		.047	
149		.025	
150		.014	
153	.36		
170	.36		
185		.001	
186		.005	
191	.36		
223		.026	
236		.020	
237		.001	
238		.015	
239		.008	
293		.004	
298		.001	
364		.001	
			.173
1971			
39		.001	
90	.36		
110	.36		
120		.039	
129		.001	
130	.36		
150	.36		
162		.011	
171		.003	
174	.36		
184		.011	

	185	.049	
	186	.003	
	193	.36	
	211	.008	
	214	.001	
	307	.002	
	337	.006	
			.136
1972			
	34	.002	
	92	.36	
	110	.36	
	130	.36	
	150	.36	
	171	.005	
	172	.019	
	173	.36	
	177	.072	
	178	.001	
	192	.36	
	201	.001	
	208	.001	
	220	.007	
	239	.005	
	240	.001	
	301	.003	
			.119
1973			
	1	.001	
	2	.001	
	33	.002	
	92	.36	
	93	.029	
	110	.36	
	116	.033	
	130	.36	
	147	.001	
	151	.36	
	172	.36	
	191	.36	
			.068

Table 4. EXAMS -- EXPOSURE ANALYSIS MODELING SYSTEM -- V2.0: MODE 2
ECOSYSTEM: POND, TIFTON GA, SUMMER (GENERIC) (25MAY84)
CHEMICAL: CGA 64250

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-----------------------------------------------------------------------------
TABLE 1.1.  SH2 (NEUTRAL MOLECULE, SPECIES #1) INPUT DATA.
MWT=   343.0      SOL =   110.0      VAPR= 3.0000E-06 HENRY= 0.0000E+00
KVO= 0.0000E+00 ESOL= 0.0000E+00 EVPR= 0.0000E+00 EHEN  = 0.0000E+00
KPS=   15.00     KPB = 0.0000E+00 KOC = 0.0000E+00 KOW   = 0.0000E+00
KAH1= 0.0000E+00 EAH1= 0.0000E+00  KNH1= 0.0000E+00 ENH1= 0.0000E+00
KAH2= 0.0000E+00 EAH2= 0.0000E+00  KNH2= 0.0000E+00 ENH2= 0.0000E+00
KAH3= 0.0000E+00 EAH3= 0.0000E+00  KNH3= 0.0000E+00 ENH3= 0.0000E+00
KBH1= 0.0000E+00 EBH1= 0.0000E+00  KOX1= 0.0000E+00 EOX1= 0.0000E+00
KBH2= 0.0000E+00 EBH2= 0.0000E+00  KOX2= 0.0000E+00 EOX2= 0.0000E+00
KBH3= 0.0000E+00 EBH3= 0.0000E+00  KOX3= 0.0000E+00 EOX3= 0.0000E+00
KBACW1= 0.0000E+00 QTW1= 0.0000E+00  KBACS1= 0.0000E+00 QTS1= 0.0000E+00
KBACW2= 0.0000E+00 QTW2= 0.0000E+00  KBACS2= 0.0000E+00 QTS2= 0.0000E+00
KBACW3= 0.0000E+00 QTW3= 0.0000E+00  KBACS3= 0.0000E+00 QTS3= 0.0000E+00
KDP= 3.0000E-04 RFLAT=  31.50      LAMAX=      0.00
QUANT1=   1.000     QUANT2= 0.0000E+00 QUANT3= 0.0000E+00
ABSORPTION SPECTRUM (ABS):   0.0000E+00   0.0000E+00   0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
 0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00  0.0000E+00
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Table 5. EXAMS -- EXPOSURE ANALYSIS MODELING SYSTEM -- V2.0: MODE 2
ECOSYSTEM: POND, TIFTON GA, SUMMER (GENERIC) (25MAY84)
CHEMICAL: CGA 64250

TABLE 16. SIMULATION RESULTS -- TIME-TRACE OF CHEMICAL CONCENTRATIONS.

TIME	AVERAGE CHEMICAL CONCENTRATIONS				MASS OF CHEMICAL	
	WATER COLUMN		BOTTOM SEDIMENTS		WATER COL	SEDIMENTS
DAYS	FREE(MG/L)	SED(MG/KG)	PORE(MG/L)	SED(MG/KG)	TOTAL KG	TOTAL KG
Runoff Input 0.066 kg						
146.	3.329E-03	4.993E-02	0.000E+00	0.000E+00	6.6600E-02	0.000E+00
147.	3.198E-03	4.798E-02	4.314E-05	6.471E-04	6.3997E-02	4.477E-04
Runoff Input 0.520 kg						
148.	2.906E-02	0.436	8.387E-05	1.258E-03	0.5815	8.704E-04
Runoff Input 0.280 kg						
149.	4.192E-02	0.629	4.591E-04	6.887E-03	0.8388	4.765E-03
Runoff Input 0.160 kg						
150.	4.828E-02	0.724	9.948E-04	1.492E-02	0.9661	1.032E-02
151.	4.640E-02	0.696	1.604E-03	2.406E-02	0.9285	1.665E-02
152.	4.460E-02	0.669	2.179E-03	3.268E-02	0.8925	2.261E-02
153.	4.288E-02	0.643	2.721E-03	4.081E-02	0.8580	2.823E-02
154.	4.123E-02	0.618	3.231E-03	4.847E-02	0.8249	3.353E-02
155.	3.964E-02	0.595	3.712E-03	5.568E-02	0.7932	3.852E-02
156.	3.812E-02	0.572	4.164E-03	6.246E-02	0.7628	4.321E-02
157.	3.667E-02	0.550	4.589E-03	6.883E-02	0.7337	4.762E-02
158.	3.527E-02	0.529	4.988E-03	7.482E-02	0.7058	5.176E-02
159.	3.394E-02	0.509	5.362E-03	8.043E-02	0.6791	5.565E-02
160.	3.266E-02	0.490	5.713E-03	8.570E-02	0.6534	5.929E-02
161.	3.143E-02	0.471	6.041E-03	9.062E-02	0.6289	6.270E-02
162.	3.025E-02	0.454	6.348E-03	9.523E-02	0.6053	6.588E-02
163.	2.912E-02	0.437	6.635E-03	9.953E-02	0.5827	6.886E-02
164.	2.804E-02	0.421	6.902E-03	0.104	0.5611	7.163E-02
165.	2.700E-02	0.405	7.151E-03	0.107	0.5403	7.421E-02
166.	2.601E-02	0.390	7.382E-03	0.111	0.5204	7.661E-02
167.	2.505E-02	0.376	7.597E-03	0.114	0.5013	7.884E-02
168.	2.414E-02	0.362	7.795E-03	0.117	0.4830	8.090E-02
169.	2.326E-02	0.349	7.979E-03	0.120	0.4655	8.280E-02
170.	2.242E-02	0.336	8.148E-03	0.122	0.4486	8.456E-02
171.	2.161E-02	0.324	8.303E-03	0.125	0.4325	8.617E-02
172.	2.084E-02	0.313	8.445E-03	0.127	0.4170	8.764E-02
173.	2.010E-02	0.301	8.575E-03	0.129	0.4021	8.899E-02
174.	1.938E-02	0.291	8.693E-03	0.130	0.3878	9.022E-02
175.	1.870E-02	0.280	8.800E-03	0.132	0.3742	9.132E-02
176.	1.804E-02	0.271	8.896E-03	0.133	0.3610	9.232E-02
177.	1.741E-02	0.261	8.983E-03	0.135	0.3484	9.322E-02
178.	1.681E-02	0.252	9.059E-03	0.136	0.3363	9.401E-02
179.	1.623E-02	0.243	9.126E-03	0.137	0.3247	9.471E-02
180.	1.567E-02	0.235	9.185E-03	0.138	0.3136	9.532E-02
181.	1.514E-02	0.227	9.236E-03	0.139	0.3029	9.585E-02
182.	1.462E-02	0.219	9.279E-03	0.139	0.2926	9.629E-02

DAYS	WATER COLUMN		BOTTOM SEDIMENTS		WATER COL	SEDIMENTS
183.	1.413E-02	0.212	9.314E-03	0.140	0.2827	9.666E-02
184.	1.366E-02	0.205	9.343E-03	0.140	0.2733	9.695E-02
Runoff	Input 0.011 kg					
185.	1.375E-02	0.206	9.364E-03	0.140	0.2752	9.718E-02
Runoff	Input 0.055 kg					
186.	1.604E-02	0.241	9.387E-03	0.141	0.3210	9.742E-02
187.	1.550E-02	0.232	9.439E-03	0.142	0.3100	9.796E-02
188.	1.497E-02	0.225	9.483E-03	0.142	0.2995	9.841E-02
189.	1.446E-02	0.217	9.520E-03	0.143	0.2894	9.879E-02
190.	1.398E-02	0.210	9.549E-03	0.143	0.2797	9.910E-02
Runoff	Input 0.280 kg					
191.	1.351E-02	0.203	9.572E-03	0.144	0.2704	9.933E-02
192.	1.307E-02	0.196	9.588E-03	0.144	0.2615	9.950E-02
193.	1.264E-02	0.190	9.598E-03	0.144	0.2529	9.961E-02
194.	1.223E-02	0.183	9.603E-03	0.144	0.2446	9.965E-02
195.	1.183E-02	0.177	9.602E-03	0.144	0.2367	9.964E-02
196.	1.145E-02	0.172	9.595E-03	0.144	0.2291	9.958E-02
197.	1.108E-02	0.166	9.585E-03	0.144	0.2217	9.946E-02
198.	1.073E-02	0.161	9.569E-03	0.144	0.2147	9.930E-02
199.	1.039E-02	0.156	9.549E-03	0.143	0.2079	9.910E-02
200.	1.007E-02	0.151	9.525E-03	0.143	0.2014	9.885E-02
201.	9.753E-03	0.146	9.498E-03	0.142	0.1952	9.856E-02
202.	9.452E-03	0.142	9.466E-03	0.142	0.1891	9.824E-02
203.	9.163E-03	0.137	9.432E-03	0.141	0.1833	9.788E-02
204.	8.885E-03	0.133	9.394E-03	0.141	0.1778	9.748E-02
205.	8.617E-03	0.129	9.353E-03	0.140	0.1724	9.706E-02
206.	8.360E-03	0.125	9.309E-03	0.140	0.1673	9.661E-02
207.	8.112E-03	0.122	9.263E-03	0.139	0.1623	9.613E-02
208.	7.873E-03	0.118	9.214E-03	0.138	0.1575	9.562E-02
209.	7.644E-03	0.115	9.163E-03	0.137	0.1529	9.509E-02
210.	7.422E-03	0.111	9.110E-03	0.137	0.1485	9.454E-02
211.	7.209E-03	0.108	9.055E-03	0.136	0.1443	9.397E-02
212.	7.004E-03	0.105	8.998E-03	0.135	0.1402	9.338E-02
213.	6.807E-03	0.102	8.940E-03	0.134	0.1362	9.277E-02
214.	6.617E-03	9.925E-02	8.879E-03	0.133	0.1324	9.215E-02
215.	6.433E-03	9.650E-02	8.818E-03	0.132	0.1287	9.151E-02
216.	6.256E-03	9.385E-02	8.755E-03	0.131	0.1252	9.085E-02
217.	6.086E-03	9.129E-02	8.690E-03	0.130	0.1218	9.019E-02
218.	5.922E-03	8.883E-02	8.625E-03	0.129	0.1185	8.951E-02
219.	5.763E-03	8.645E-02	8.559E-03	0.128	0.1153	8.882E-02
220.	5.611E-03	8.416E-02	8.491E-03	0.127	0.1123	8.812E-02
221.	5.463E-03	8.195E-02	8.423E-03	0.126	0.1093	8.741E-02
222.	5.321E-03	7.982E-02	8.354E-03	0.125	0.1065	8.669E-02
Runoff	Input 0.290					
223.	1.968E-02	0.295	8.284E-03	0.124	0.3937	8.597E-02
224.	1.898E-02	0.285	8.402E-03	0.126	0.3797	8.719E-02
225.	1.831E-02	0.275	8.508E-03	0.128	0.3663	8.829E-02
226.	1.766E-02	0.265	8.604E-03	0.129	0.3534	8.929E-02
227.	1.705E-02	0.256	8.690E-03	0.130	0.3411	9.018E-02
228.	1.645E-02	0.247	8.767E-03	0.132	0.3292	9.098E-02
229.	1.589E-02	0.238	8.834E-03	0.133	0.3178	9.168E-02

DAYS	WATER COLUMN		BOTTOM SEDIMENTS		WATER COL	SEDIMENTS
230.	1.534E-02	0.230	8.894E-03	0.133	0.3069	9.229E-02
231.	1.481E-02	0.222	8.945E-03	0.134	0.2964	9.282E-02
232.	1.431E-02	0.215	8.988E-03	0.135	0.2864	9.328E-02
233.	1.383E-02	0.207	9.024E-03	0.135	0.2767	9.365E-02
234.	1.336E-02	0.200	9.054E-03	0.136	0.2674	9.396E-02
235.	1.292E-02	0.194	9.077E-03	0.136	0.2585	9.419E-02
Runoff Input 0.220 kg						
236.	2.349E-02	0.352	9.093E-03	0.136	0.4699	9.437E-02
Runoff Input 0.011 kg						
237.	2.319E-02	0.348	9.247E-03	0.139	0.4641	9.596E-02
Runoff Input 0.165 kg						
238.	3.061E-02	0.459	9.394E-03	0.141	0.6125	9.749E-02
Runoff Input 0.088 kg						
239.	3.399E-02	0.510	9.635E-03	0.145	0.6802	9.998E-02
240.	3.275E-02	0.491	9.915E-03	0.149	0.6552	0.103
241.	3.155E-02	0.473	1.017E-02	0.153	0.6313	0.106
242.	3.040E-02	0.456	1.041E-02	0.156	0.6083	0.108
243.	2.930E-02	0.440	1.064E-02	0.160	0.5863	0.110
244.	2.825E-02	0.424	1.084E-02	0.163	0.5652	0.112
245.	2.724E-02	0.409	1.103E-02	0.165	0.5450	0.114
246.	2.626E-02	0.394	1.120E-02	0.168	0.5255	0.116

Figure 1. Pond EECs for Tifton GA in 1970

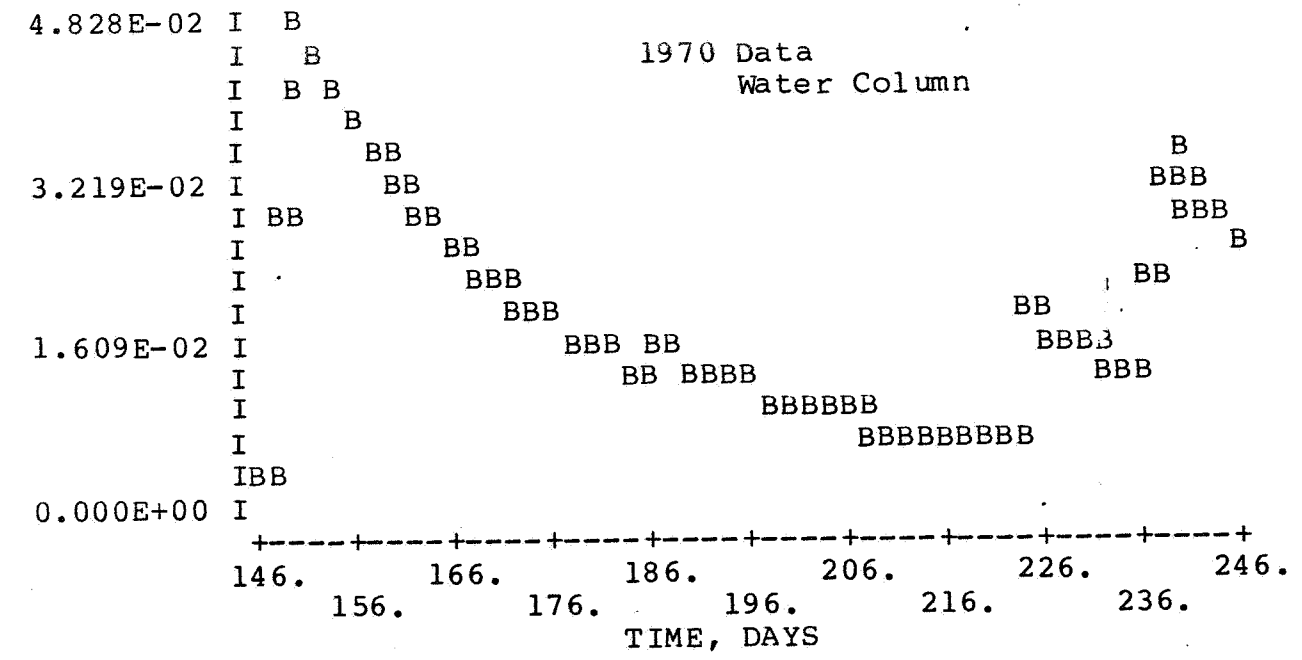
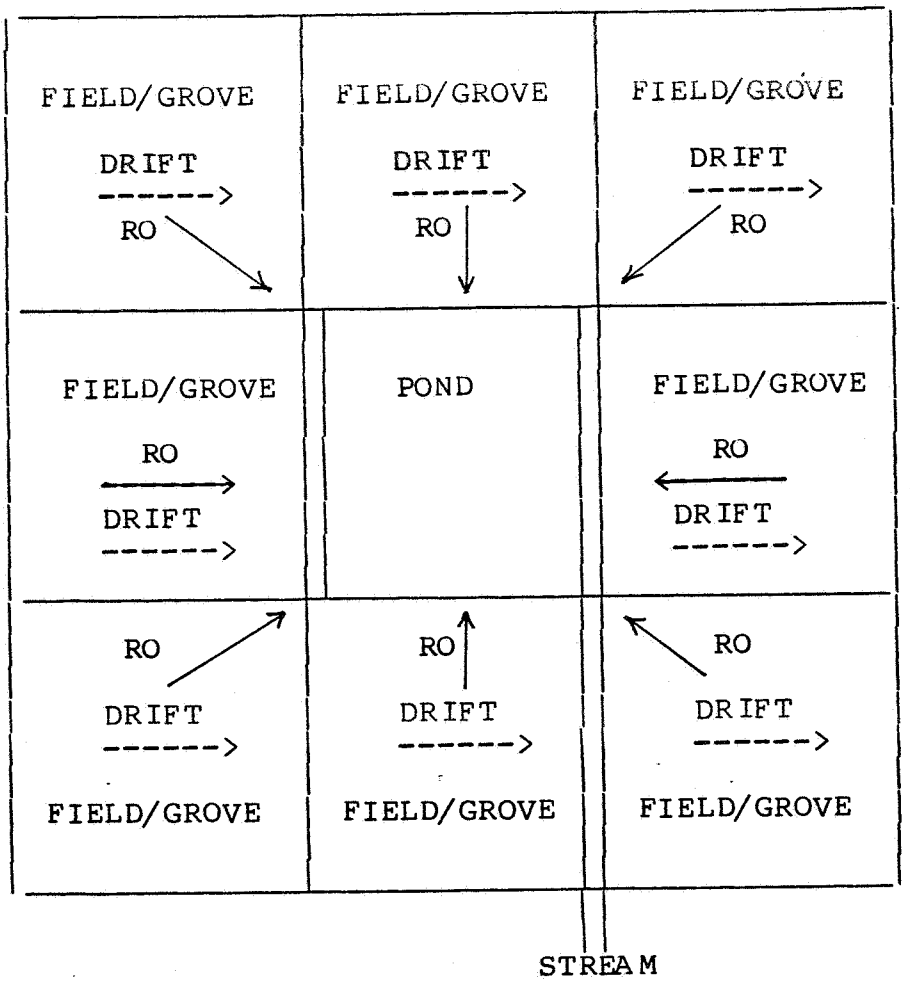


Figure 2. Runoff input verses drift input to a pond.



RO = Runoff from the field/grove

DRIFT = Spray Drift from the field/grove

Assumption:
Each field and the pond are 1 acre (approx 210 feet square).

Table 6. Spray Drift Modeling Results

Model: Holst Spray Drift Model (Ballistic)

Application Rate: 0.36 lb/acre

Height of Application: 30 feet

Crosswind speed: 10 mph

Nozzle type: Fan nozzle (65018), 40 psi, 278 VMD

Quantity*	Distance
0.04 lb/acre or 50 ppb	300 feet
0.01 lb/acre or 12 ppb	1000 feet

Nozzle type: D-4 directed forward, 35 psi, 263 vmd

Quantity*	Distance
0.02 lb/acre or 40 ppb	300 feet
0.006 lb/acre or 7.5 ppb	1000 feet

* Quantities refer to those amounts predicted to be present at the surface (lb/acre) of soil or in 6 inches of water (ppb).