U.S. GEOLOGICAL SURVEY



Table 1: Characteristics and properties of commonly used pesticides in the Apalachicola-Chattahoochee-Flint (ACF) River basin

[° C, degrees Celsius; mg/L, milligrams per liter; K_{ow}, octanol-water partioning coefficient; mL/gm, milliliters per gram; mm Hg, millimeters of mercury; NAWQA, National Water Quality Assessment program; nv, no value in references; --, not analyzed]

Acephate Orthene, Payload Acifluorfen-Na salt Blazer, Scepter O.T., Tackle Alachlor Cropstar GB, Lasso, Micro-Te Aldicarb Temik Atrazine Aatrex, Bicep, Extrazine, Gua Marksman Benefin (Benfluralin) Balan, Balfin Benomyl Benlate, Tersan Bensulide Betasan, Prefar Bentazon-Na salt Basagran Brigade, Capture, Talstar	Pesticide type insecticide herbicide artner herbicide insecticide, acaricide, nematac	Organophosphorus Diphenyl ether Acid amide	(at 20 to 25° Č), in mg/L 818,000 250,000	-1.87	coefficient ^{2/} , in mL/gm 2 113 (estimated)	pressure ²⁷ , in mm Hg 1.7x10 ⁻⁶	Acid pK _a /Base pK _b ^{2/} not applicable	half-life ^{2/} , in days	Principal uses crops, domestic	class ^{3/}	per medium	active ingredient per acre .18 to 1.0	Ground-water leaching potential small	Runoff potential in suspension	Runoff potential in solution medium
Acifluorfen-Na salt Blazer, Scepter O.T., Tackle Cropstar GB, Lasso, Micro-Te Aldicarb Temik Atrazine Aatrex, Bicep, Extrazine, Gua Marksman Benefin (Benfluralin) Balan, Balfin Benomyl Benlate, Tersan Bensulide Betasan, Prefar Bentazon-Na salt Basagran Bifenthrin Brigade, Capture, Talstar	herbicide artner herbicide	Diphenyl ether	·		113 (estimated)	1./X10	пот аррисаоте	3	crops, domestic	111		.16 to 1.0	Siliali	Siliali	IIICUIUIII
Aldicarb Atrazine Aatrex, Bicep, Extrazine, Guamarksman Benefin (Benfluralin) Benomyl Benlate, Tersan Bensulide Betasan, Prefar Bentazon-Na salt Bifenthrin Brigade, Capture, Talstar		Acid amide			113 (cstillated)	0	nv	14	peanuts, soybeans	I, III	water	.25 to .50	medium (estimated)	small (estimated)	medium (estimated)
Atrazine Aatrex, Bicep, Extrazine, Guar Marksman Benefin (Benfluralin) Balan, Balfin Benomyl Benlate, Tersan Bensulide Betasan, Prefar Bentazon-Na salt Basagran Bifenthrin Brigade, Capture, Talstar	insecticide, acaricide, nematac		240	2.9	170	1.4x10 ⁻⁵	not applicable	15	corn, soybeans	I	water	1.0 to 3.25	medium	small	medium
Marksman Benefin (Benfluralin) Balan, Balfin Benomyl Benlate, Tersan Bensulide Betasan, Prefar Bentazon-Na salt Basagran Bifenthrin Brigade, Capture, Talstar			6,000	1.1	30	$3x10^{-5}$	not applicable	30	crops	I	water	.5 to 2.1	large	small	medium
Benomyl Benlate, Tersan Bensulide Betasan, Prefar Bentazon-Na salt Basagran Bifenthrin Brigade, Capture, Talstar	an, herbicide	Triazine	33	2.7	100	2.89x10 ⁻⁷	$pK_b = 12.32$	60	corn, turf	III	water	1.0 to 2.5	large	medium	large
Bensulide Betasan, Prefar Bentazon-Na salt Basagran Bifenthrin Brigade, Capture, Talstar	herbicide	Dinitroaniline	0.1	nv	9,000	6.6×10^{-5}	not applicable	40 67	peanuts, domestic, turf	IV IV	water	1.12 to 3.0	small	large	medium
Bifenthrin Brigade, Capture, Talstar	fungicide herbicide	Benzimidazole Organophosphorus	2.0 5.6	1.4 nv	1,900 1,000 (estimated)	$<1x10^{-10}$ $8.0x10^{-7}$	not applicable not applicable	120	orchards, vegetables turf, domestic, vegetables	III		1.0 5 to 12.5	small medium (estimated)	large large (estimated)	large large (estimated)
	herbicide	Benzothiadiazole	2,300,000	2.34	34	0	nv	20	peanuts, corn, turf	III	water	.75 to 2.0	large	small	medium
Promost 17	insecticide, miticide	Synthetic pyrethroid	.1	6	240,000	1.8×10^{-7}	not applicable	26	cotton	II		.04 to .08	nv	nv	nv
Bromacil Hyvar, Krovar Butylate Sutan +, Genate +	herbicide herbicide	Uracil Thiocarbamate	700 44	2.0 4.15	32 400	3.1×10^{-7} 1.3×10^{-2}	$pK_a = 9.1$ not applicable	60	noncropland	II III	water	2 to 12 3.0 to 6.0	large nv	medium nv	large nv
Captan, Orthocide	fungicide	Phthalimide	5.1	2.35	200	8.0×10^{-8}	not applicable	2.5	peaches, seed treatment	I		3.0 to 4.0	nv	nv	nv
Carbaryl Sevin, Adios Chlorimuron Ethyl Classic	insecticide herbicide	Carbamate Sulfonylurea	1200 (5H-7)	2.3 0.1	300	$1.2x10^{-6}$ $4x10^{-12}$	not applicable	10 40	crops, domestic	I,II,III,IV III	water	0.5 to 3.0 .008 to .07	small	small	medium
Chlorothalonil Bravo, Daconil, Echo	fungicide	Chlorinated hydrocarbon	1,200 (pH=7) .6	2.64	110 (pH=7) 1,380	1×10^{-3}	$pK_a = 4.2$ not applicable	30	peanuts, soybeans crops, turf, domestic	I, II	 water	about 1.25	large small	small medium	large medium
Chlamarifa	insecticide	0	4	5.0	6,070	(estimated) 1.7x10 ⁻⁵	not annliashla	20	anna kuf damakia	11 111		.5 to 13.0	11	1	
Chlorpyrifos Lorsban, Dursban, Lock-on		Organophosphorus	.4	5.0			not applicable	30	crops, turf, domestic	II,III	water		small	medium	small
Chlorsulfuron Telar, Glean Copper sulfate Many names	herbicide algicide, fungicide	Substituted urea Inorganic	7,000 (pH=7) 143,000	-1.0 nv	40 (pH=7) nv	4.6×10^{-6}	$pK_a = 3.6$	40 nv	roadsides, small grains aquatic	IV I	water water, sediment	.13 to .25 .7 to 5.4	large nv	medium nv	large
		-				1 6 10-9						(pounds/acre-foot)			
Cyanazine Bladex Cyfluthrin Baythroid, Tempo	herbicide insecticide	Triazine Synthetic pyrethroid	.002	2.1 5.9	190 100,000 (estimated)	1.6x10 ⁻⁹ 1.6x10 ⁻⁸	$pK_b = 12.9$ not applicable	14 30 (estimated)	cotton, corn	II,III I	water 	.6 to 1.2 .05 to 0.1	medium nv	small nv	medium nv
Cypermethrin Ammo, Arrivo, Cymbush	insecticide	Synthetic pyrethroid	.004	6.6	100,000 (estimated)	1.4x10 ⁻⁹	not applicable	30 (estimated)	pecans, cotton	II,III		.06 to 1.0	extra small (estimated)) medium (estimated)	
Diazinon Diazinon	insecticide, nematicide	Organophosphorus	60	3.3	1,000 (estimated)	6x10 ⁻⁵	not applicable	40	many	II,III	water	.25 to .5	small (estimated)	large (estimated)	large (estimated)
Dicamba-Na salt Banvel Dichlobenil Casoron	herbicide herbicide	Phenoxy Benzonitrile	400,000 21.2	.50 (acid) 2.9	2 400 (estimated)	$0 \\ 1x10^{-3}$	$pK_a = 1.91$ not applicable	60	turf, forests, hay, pasture aquatic, fruit, ornamentals	III	water	.25 to 1.0 10 to 15	large medium (estimated)	small medium (estimated)	medium large (estimated)
2,4-D acid 2,4-D	herbicide	Phenoxy	890	2.8	20	8x10 ⁻⁶	$pK_a = 2.8$	10	many	I	water	0.24 to 2.0	medium	small	medium
2,4-D dimethylamine salt (2,4-D amine) Weed Rhap, Weedar	herbicide	Phenoxy	796,000	nv	20	0	$pK_a = 2.8$	10	many	I	water, as 2,4-D acid	.24 to 2.0	medium	small	medium
2,4-D esters and oil-soluble amines Aqua Kleen, Dacamine, Weed	and others herbicide	Phenoxy	100 (estimated)	nv	100 (estimated)	nv	$pK_a = 2.8$	10	many	II, III	water,	.24 to 2.0	medium (estimated)	small (estimated)	medium (estimated)
2,4-DB butoxyethyl ester Butyrac Ester	herbicide	Phenoxy	8	5.0	500	<1x10 ⁻⁷	$pK_a = 4.8$	7	turf, peanuts	III	as 2,4-D acid water,	.27	small	small	medium
		·	700 000					10 (Ш	as 2,4-DB acid				
2,4-DB dimethylamine salt Butyrac	herbicide	Phenoxy	709,000	.60 to .66	20 (estimated)	0	$pK_a = 4.8$	10 (estimated)	turf, peanuts	III	water, as 2,4-DB acid	.27	medium (estimated)	small (estimated)	medium (estimated)
Dichlorprop (2,4-DP ester) Weedone	herbicide	Phenoxy	50 (estimated)	nv	1,000 (estimated)	$3x10^{-6}$	$pK_a = 2.86$	10	turf, forests, roadsides	II	water, as 2,4-DP acid	.7 to .9	nv	nv	nv
1,3-Dichloropropene Telone II	soil fumigant	Aliphatic	2,250	1.6	32	29	not applicable	10	crops, forests, vegetables	II	water	85 to 970	medium	small	medium
Dimethoate Cygon Diquat dibromide salt Aquacide, Weedtrine	insecticide, acaricide herbicide	Organophosphorus Bipyridium	39,800 718,000	.50 to .78 -4.6	20 1,000,000 (estimated)	2.5×10^{-5}	not applicable $pK_b = 10 \text{ (estimated)}$	7 1,000	crops, pecans, domestic	II	water 	.13 to .5	medium extra small (estimated)	small	medium small (estimated)
		Бірупшшіі		-4.0			Ī	1,000	aquane	11		(pounds/surface acre)	extra sman (estimated)	large (estimated)	sman (estimated)
Disulfoton Disyston Diuron Diuron, Karmex	insecticide, acaricide herbicide	Organophosphorus Substituted urea	25 42	4.0 2.8	600 (estimated) 480	1.5×10^{-4} 6.9×10^{-8}	not applicable not applicable	30 (estimated) 90	pecans, small grains orchards, cotton, hay,	III	water	1.0 to 3.0 .4 to 3.2	small (estimated) medium	small (estimated) medium	large (estimated)
									noncropland	111					
Endosulfan Thiodan, Phaser Endothall salt Aquathol, Hydrothol	insecticide, acaricide algicide	Chlorinated hydrocarbon unclassified	.32 100,000 (pH=7)	3.6 89	12,400 20 (estimated) (pH=7)	1.7x10 ⁻⁷	not applicable $pK_a = 3.4, 6.7$	50 7	crops, pecans aquatic	I	sediment 	.5 to 1.5 1.3 to 21	large (guess)	small (guess)	medium (guess)
												(pounds/acre-foot)			
Esfenvalerate Asana Ethalfluralin Sonalan	insecticide herbicide	Synthetic pyrethroid Dinitroaniline	.002	6.2 nv	5,300 4,000	1.1x10 ⁻⁸ 8.8x10 ⁻⁵	not applicable not applicable	35 60	peanuts, cotton, soybeans peanuts, soybeans	II	water	.015 to .05	small small	medium large	medium medium
Ethephon Cerone, Ethrel, Prep	plant-growth regulator	Organophosphorus	1,239,000	22	100,000 (estimated)	7.5x10 ⁻⁵	nv	10	cotton	I, II, III		1.0 to 2.0	extra small (estimated)) medium (estimated)	
Fenamiphos Nemacur	nematacide, insecticide	Organophosphorus	400	3.25	100	$1x10^{-6}$	not applicable	50 (estimated)	crops	I		.75 to 9.0	large (estimated)	medium (estimated)	
Fluazifop-p-butyl Fusilade Fluometuron Cotoran	herbicide herbicide	Phenoxy Substituted urea	2 110	nv 2.4	5,700 100	2.5×10^{-7} 9.4×10^{-7}	not applicable	15 85	cotton, soybeans, orchards	IV II	 water	.09 to .25	small large	medium medium	medium large
Fluridone Sonar	herbicide	unclassified	10	nv	1,000	1x10 ⁻⁷	$pK_b = 12.3$	21	aquatic	IV		.5 to 4.0	small (estimated)	medium (estimated)	
Fonofos Dyfonate	insecticide	Organophosphorus	16.9	3.9	870	3.4x10 ⁻⁴	not applicable	40	peanuts, corn	I, II	water	(pounds/surface acre) 4.0 to 10	small	small	large
Glyphosate isopropyl-amine salt Roundup, Accord, Rodeo, Rar	herbicide	Organophosphorus	900,000 (estimated)	-1.6	24,000 (estimated)	0	$pK_a = 2.3, 5.86, 10.9$	47	many	I		.38 to 4.0	extra small (estimated)		large (estimated)
Hexazinone Velpar	herbicide	Triazine	33,000	1.05	54	2.0×10^{-7}	not applicable	90	forests, noncropland	I		.5 to .75	large	medium	large
Imazapyr acid Arsenal, Topsite Imazaquin-NH ₄ salt Scepter, Squadron,	herbicide herbicide	Imidazolinone Imidazolinone	11,000 160,000 (estimated) (pH=7)	.11) nv	100 (estimated) 20 (estimated) (pH=7)	<1x10 ⁻⁸	$pK_a = 1.9, 3.6$ $pK_a = 3.8$	90	forests, noncropland soybeans	IV I, III		.38 to .63	large (estimated)	medium (estimated) medium (estimated)	,
Tri-scept Imazethapyr Passport, Pursuit, Resolve	herbicide	Imidazolinone	200,000 (estimated) (pH=7) 149	10 (estimated) (pH=7)		$pK_a = 2.1, 3.9$	90	soybeans, peanuts	III		.063	nv	nv	ny
Lambdacyhalothrin Karate	insecticide, acaricide	Synthetic pyrethroid	.005	nv	180,000	1.5x10 ⁻⁹	not applicable	30	cotton	nv		.04 to .08	nv	nv	nv
Lindane Isotox, Lindane	insecticide	Chlorinated hydrocarbon	7	3.6	1,100	$3.3x10^{-5}$	not applicable	400	orchards, vegetables, forests	II	water, sediment, biota	.4 to 1.0	medium	large	large
Linuron Lorox Malathion Cythion, Malathion	herbicide insecticide	Substituted urea	75 130	2.2	400 1,800	$1.7x10^{-5}$ $8x10^{-6}$	not applicable	60	vegetables, row crops, noncropland	III	water	.17 to 1.5 1.0 to 6.0	medium small	large small	medium small
Maleic Hydrazide-(K-salt) Retard, Royal	plant-growth regulator	Organophosphorus Hydrazide	400,000	-1.96	20 (estimated)	0	$pK_a = 5.65$	30	domestic, crops, mosquito control tobacco, turf	IV	water 	1.5 to 3.0	large (estimated)	small (estimated)	medium (estimated)
Mancozeb Dithane, Manzate, Penncozeb	fungicide	Dithiocarbamate	6	3.1 to 3.7	>2,000	0	not applicable	70	forests, vegetables, fruit	IV		1.2 to 4.8	small	large	large
MCPA Dimethylamine salt Chiptox, Rhomene, Rhonox MCPA and a salt	herbicide	Phenoxy	866,000 (pH=7)	nv	20 (estimated) (pH=7)	_	$pK_a = 3.12$	25	professional turf care	I	water, as MCPA acid	.17 to 1.5	large (estimated)	small (estimated)	medium (estimated)
MCPA ester MCP Ester, Weedone Mecoprop Dimethyamine salt Chipco, MCPP	herbicide herbicide	Phenoxy Phenoxy	5 (estimated) 660,000 (pH=7)	nv 3.1	1,000 (estimated) 20 (estimated) (pH=7)	1.5×10^{-6}	not applicable $pK_a = 3.11$	25 21	professional turf care, small grains professional turf care, small grains	I	water, as MCPA acid	.12 to 2.8 .5 to 1.4	small (estimated) large (estimated)	medium (estimated) small (estimated)	medium (estimated) medium (estimated)
Methanearsonic acid (MSMA) Ansar, Arsonate, Bueno, Daco		Aliphatic organic arsenical	1,400,000	nv	100,000 (estimated)	0	$pK_a = 4.11, 9.15$	1,000 (estimated)	•	III		2.0 to 3.6	nv	nv	nv
Methomyl Lannate	insecticide	Carbamate	58,000	.1	72	5.0×10^{-5}	not applicable	30	many crops	I	water	.13 to 1.0	large	small	medium
Metolachlor Dual Metribuzin Lexone, Sencor	herbicide herbicide	Acid amide Triazine	530 1,220	2.93 to 3.45 1.6 to 1.7	200 60 (estimated)	3.1×10^{-5} < 1×10^{-5}	not applicable $pK_b = 13.0$	90	peanuts, corn, soybeans soybeans, corn, noncropland	III	water	1.5 to 2.0 .25 to .5	large (estimated)	medium small (estimated)	large (estimated)
Norflurazon Solicam, Zorial	herbicide	Pyridazinone	28	nv	700	$2x10^{-8}$	not applicable	30 (estimated)	cotton, pecans, orchards,	IV	water	1.0 to 3.0	medium	medium	large
Oryzalin Surflan	herbicide	Dinitroaniline	2.5	nv	600	<1x10 ⁻⁸	$pK_a = 8.6$	20	soybeans turf, orchards, soybeans	IV	water	1.5 to 6.0	small	small	medium
Paraquat Dichloride salt Cyclone, Gramoxone, Starfire	herbicide	Bipyridium	620,000	nv	1,000,000 (estimated)		pK _b <4 (estimated)	1,000 (estimated)	•	I		.13 to .94	extra small (estimated)		small (estimated)
Parathion-methyl Methyl parathion, Penncap-M	insecticide	Organophosphorus	60	1.91 to 2.04	5,100 (estimated)	1.5x10 ⁻⁵	not applicable	5	peaches, many crops	I, II	water	.5 to 1.0	small (estimated)	medium (estimated)	medium (estimated)
Pendimethalin Prowl	herbicide	Dinitroaniline	.275	5.2	5,000	9.4x10 ⁻⁶	not applicable	90	many crops	III	water	.5 to 4.0	small	large	medium
Permethrin Ambush, Pounce Phorate Thimet	insecticide insecticide	Synthetic pyrethroid Organophosphorus	.006 22	5.0 2.9 to 3.9	100,000 1,000 (estimated	$1.3x10^{-8}$ $6.4x10^{-4}$	not applicable	30 60 (estimated)	many crops small grains, peanuts, cotton	II, III	water water	.1 to .2 .3 to .3.0	extra small small (estimated)	medium large (estimated)	small large (estimated)
Picloram salt Tordon	herbicide	Picolinic acid	200,000 (estimated)	.3	1,000 (estimated	0	$pK_a = 1.9, 4.0$	90	forests, roadsides, pastures	I	water	.3 to .3.0	large (estimated)	medium (estimated)	-
Profenofos Curacron	insecticide, acaricide	Organophosphorus	28	1.9	2,000	9.0x10 ⁻⁷	not applicable	8	cotton	II		.75 to 1.0	small	medium	medium
Prometon Pramitol	herbicide	Triazine	720	2.7	150	7.7×10^{-6}	$pK_b = 9.73$	500	noncropland, roadsides	I	water	8 to 20	large	large	medium
Sethoxydim Poast, Torpedo Simazine Princep, Aquazine	herbicide herbicide	Cyclohexene Triazine	4,390 (pH=7) 6.2	nv 2.19	100 (estimated) (pH=7)	$1.6x10^{-7}$ $2.2x10^{-8}$	not applicable $pK_b = 12.35$	5 60	peanuts, turf, orchards, vegetables orchards, turf, corn,	III IV	 water	.19 to .47 1.0 to 2.5 (crops)	small (estimated)	small (estimated) medium	medium (estimated) large
									aquatic			2.7 to 5.4, pounds/acre-foot, aquation	-		
Sulfometuron Methyl Oust	herbicide	Substituted urea	70 (pH=7)	5 (pH=7)	78 (pH=7)	6.0×10^{-16}	$pK_a = 5.2$	20	noncropland, domestic, forests	IV	-	.009 to .04	medium	small	large
Sulfur Many names Tobuthiuron Spike	fungicide, acaricide	inorganic	insoluble	nv	nv 80	nv 2×10 ⁻⁶	nv not applicable	nv 360	peaches, vegetables	IV	water, sediment	4.0 to 6.0	nv	nv	nv
Tebuthiuron Spike Thiodicarb Larvin	herbicide insecticide	Substituted urea Carbamate	2,500 19.1	1.79 1.2 to 1.6	80 350	$2x10^{-6}$ $1x10^{-7}$	not applicable not applicable	360 7	forests, noncropland, turf cotton, soybeans	III	water 	.5 to 6.0 .13 to .9	large small	medium small	large
Tralomethrin Scout	insecticide	Synthetic pyrethroid	.001 (estimated)	nv	100,000 (estimated)	1.3×10^{-13}	not applicable	27	cotton, soybeans	I		.018 to .024	nv	nv	nv
Tribufos (Merphos) Def, Folex	defoliant	Organophosphorus	2.3	nv	5,000	1.6x10 ⁻⁶	not applicable	10	cotton	II		.75 to 1.9	nv	nv	nv
Triclopyr amine salt Garlon, Turflon	herbicide	Picolinic acid	2,100,000	.48	20 (estimated)	0	$pK_a = 2.68$	46	forest, pasture, roadsides	I	water, as triclopyr mono acid	.4 to .5	nv	nv	nv
	herbicide	Picolinic acid	23	nv	780	1.26x10 ⁻⁶	$pK_a = 2.68$	46	forest, pasture, roadsides	III	water, as triclopyr mono acid	.4 to .5	nv	nv	nv
Triclopyr ester Garlon, Grazon, Turflon	herbicide	Dinitroaniline	.3	5.3	8,000	1.1x10 ⁻⁴	not applicable	60	cotton, soybeans, vegetables	I, II, III	water	.5 to 1.0	small	large	medium
Trifluralin Passport, Treflan, Tri-4															
	fungicide herbicide	Organometalic Thiocarbamate	1 108	nv nv	23,000 260	$3.5x10^{-7}$ $9.7x10^{-3}$	not applicable	75 12	pecans, peanuts corn, peanuts, soybeans	III		.16 to 1.0 2.0 to 2.6	nv nv	nv nv	nv nv

^{1/}From Meister (1992). ^{2/}From Wauchope and others (1992).

^{3/} From Meister (1992).							
Toxicity class	Signal words required on label by EPA	Oral LD _{50,} mg/kg	Dermal LD ₅₀ , mg/kg, 24-hour exposure	Equivalent oral dose for adult humans			
I. Highly toxic	DANGER, POISON, plus Skull and crossbones symbol	0 to 50	0 to 200	A few drops to 1 teaspoon			
II. Moderately toxi	c WARNING	50 to 500	200 to 2,000	1 teaspoon to 2 tablespoons			
III. Slightly toxic	CAUTION	500 to 5,000	2,000 to 20,000	1 ounce to 1 pint (1 pound)			
IV. Low toxicity	CAUTION	5,000	20,000	1 pint (1 pound) or more			

From Delaplane (1991, p. 403). From Delaplane (1991, p. 403).

OPEN-FILE REPORT 95-739

Stell, Susan M., Evelyn H. Hopkins, Gary R. Buell, and Daniel J. Hippe, 1995

Use and Occurrence of Pesticides in the Apalachicola-Chattahoochee-Flint River basin, Georgia, Alabama, and Florida, 1960-91