APPENDIX A
ANALYSIS OF PRODUCTS WITH TWO OR MORE ACTIVE INGREDIENTS

The Agency does not routinely include, in its risk assessments, an evaluation of mixtures of active ingredients, either those mixtures of multiple active ingredients in product formulations or those in the applicator's tank. In the case of the product formulations of active ingredients (that is, a registered product containing more than one active ingredient), each active ingredient is subject to an individual risk assessment for regulatory decision regarding the active ingredient on a particular use site. If effects data are available for a formulated product containing more than one active ingredient, they may be used qualitatively or quantitatively[1] [2].

There are no product LD50 values, with associated 95% Confidence Intervals (CIs) available for glyphosate.

As discussed in USEPA (2000) a quantitative component-based evaluation of mixture toxicity requires data of appropriate quality for each component of a mixture. In this mixture evaluation an LD50 with associated 95% CI is needed for the formulated product. The same quality of data is also required for each component of the mixture. Given that the formulated products for glyphosate do not have LD50 data available it is not possible to undertake a quantitative or qualitative analysis for potential interactive effects. However, because the active ingredients are not expected to have similar mechanisms of action, metabolites, or toxicokinetic behavior, it is reasonable to conclude that an assumption of dose-addition would be inappropriate. Consequently, an assessment based on the toxicity of glyphosate is the only reasonable approach that employs the available data to address the potential acute risks of the formulated products.

[1] Overview of the Ecological Risk Assessment Process in the Office of Pesticide Programs, Environmental Protection Agency (January 2004) (Overview Document).

[2] Memorandum to Office of Prevention, Pesticides and Toxic Substance, US EPA conveying an evaluation by the U.S. Fish and Wildlife Service and National Marine Fisheries Service of an approach to assessing the ecological risks of pesticide products (January 2004).

Pesticide Products Formulated with Glyphosate and Other Pesticide Active Ingredients

GLYPHOSATE PRODUCTS[3,4]

PRODUCT/TRADE NAME	EPA Reg.No.	% Glyphosate	PRODUCT		ADJUSTED FOR ACTIVE INGREDIENT	
			LD 50 (mg/kg)	CI (mg/kg)	LD50 (mg/kg)	CI (mg/kg)
TOUCHDOWN DIQUAT HOME AND GARDEN CONCENTRATE	00010001179	13.4	>5000	N/A	N/A	N/A
TOUCHDOWN DIQUAT HOME AND GARDEN READY TO USE	00010001180	0.81	>5000	N/A	N/A	N/A
SEQUENCE HERBICIDE	00010001185	21.8	>5000	N/A	N/A	N/A
TOUCHDOWN 008	00010001186	43.5	>5000	N/A	N/A	N/A
ORTHO SEASON-LONG GRASS & WEED KILLER	00023902694	8	>5000	N/A	N/A	N/A
STANDOUT HERBICIDE	00024100404	21.9	>5000	N/A	N/A	N/A
ETK-2301 HERBICIDE	00035200675	9.6	No Data	N/A	N/A	N/A
CHEMSICO HERBICIDE CONCENTRATE DT	00968800211	14.6	>5000	N/A	N/A	N/A
CHEMSICO HERBICIDE RTU DT	00968800213	0.81	>5000	N/A	N/A	N/A
NUFARM GLYKAMBA BROADSPECTRUM HERBICIDE	07136800030	23.3	>5000	N/A	N/A	N/A
RECOIL BROAD SPECTRUM HERBICIDE	07136800035	23.03	>2000	N/A	N/A	N/A

[3] From registrant submitted data to support registration. Compiled by Office of Pesticide Programs Registration and Health Effects Divisions.
[4] Glyphosate: LD50= >5000 mg/kg

ECOTOX Open Literature Bibliography on Glyphosate Mixtures

The glyphosate team was not able to obtain all of the available data on mixtures from the open literature. Of the studies that were examined, generally the quantitative expression of exposure could not be translated such that it could be compared to the endpoints used in assessment of risk. The following is a list of citations for all of the mixture studies identified.

Abdelghani, A. A.; Tchounwou, P. B.; Anderson, A. C.; Sujono, H.; Heyer, L. R., and Monkiedje, A. Toxicity Evaluation of Single and Chemical Mixtures of Roundup, Garlon-3A, 2,4-D, and Syndets Surfactant to Channel Catfish (Ictalurus punctatus), Bluegill Sunfish (Lepomis microchirus), and Crawfish (Procambarus spp.). MOR. 20537: WATER,AQUA; 1997; 12, (3): 237-243.
Notes: EcoReference No.: 46779
Chemical of Concern: GYPI,24D,TPR

Al-Khatib, K. and Peterson, D. Soybean (Glycine max) Response to Simulated Drift from Selected Sulfonylurea Herbicides, Dicamba, Glyphosate, and Glufosinate. GRO,PHY,POP. K. Al-Khatib, Department of Agronomy, Kansas State University, Manhattan, KS 66506: SOIL,ENV; 1999; 13, (2): 264-270.
Notes: EcoReference No.: 63448
Chemical of Concern: DMB,GYP

Altland, J. E.; Gilliam, C. H., and Wehtje, G. Weed Control in Field Nurseries. 2003; 13, (1): 9-14.
Notes: Chemical of Concern: GYP
Abstract: SHANNON Abstract: Herbicide use is an important component of weed management in field nursery crops. No single herbicide controls all weed species. Oxyfluorfen, simazine, and isoxaben are preemergence herbicides effective against broadleaf weeds. Oryzalin, pendimethalin, and prodiamine are effective in preemergence control of grasses and some small-seeded broadleaf weeds. Metolachlor is the only herbicide currently labeled for nursery crops that is effective in preemergence nutsedge (Cyperus) control. Fluazifop-butyl, sethoxydim, and clethodim are selective postemergence herbicides used for grass control. Glyphosate, paraquat, and glufosinate are nonselective postemergence herbicides used in directed spray applications for broad-spectrum weed control. Bentazon, halosulfuron, and imazaquin are effective postemergence nutsedge herbicides. These herbicides are discussed with respect to their chemical class, mode of action, labeled rates, and current research addressing their effectiveness in nursery crops.
50 refs.
Language: English
English
Publication Type: Journal
Publication Type: Review

Country of Publication: United States
Classification: 92.10.4.1 CROP SCIENCE: Crop Protection: Weeds
Subfile: Plant Science

Bailey, B. A. ; Collins, R., and Anderson, J. D. Factors Influencing the Herbicidal Activity of Nep1, a Fungal Protein That Induces the Hypersensitive Response in Centaurea Maculosa. 2000.
Notes: Chemical of Concern: GYP
Abstract: CAROLYN Descriptors: Bioherbicide
Descriptors: Elicitor
Descriptors: Hypersensitive response
Abstract: The fungal protein Nep1, produced by Fusarium oxysporum f.sp. erythroxyli in liquid culture, caused extensive necrosis to Centaurea maculosa when water solutions of Nep1 (5 (mu)g ml⁻¹) and an organosilicone surfactant (1,1,1,3,5,5,5-heptamethyltrisiloxanyl propyl-methoxy-poly[ethylene oxide]) were applied as foliar sprays. Nep1 did not cause necrosis when applied with a nonionic surfactant or organosilicone surfactant plus unrefined corn oil. Plant age, protein concentration, organosilicone surfactant concentration, and the presence of a dew period influenced the amount of necrosis caused by Nep1. The addition of an 18-h dew period after treatment resulted in an increase of 10% or more in foliar necrosis at the 0.313 and 1.25 (mu)g ml⁻¹ (0.40 and 1.62 g ai ha⁻¹) Nep1 concentrations. Increasing the spray volume from 129 ml m⁻² (1,291.3 L ha⁻¹) to 516 ml m⁻² (5,165.2 L ha⁻¹) more than doubled the amount of foliar necrosis caused by the 0.313 (mu)g ml⁻¹ (0.40 g ai ha⁻¹ vs 1.62 g ai ha⁻¹) Nep1 concentration. A maximum necrosis rating of 95% was reached by 1.25 (mu)g ml⁻¹ Nep1 applied at 516 ml m⁻² (6.46 g ai ha⁻¹) followed by an 18-h dew period. Nep1 (6.46 g ai ha⁻¹) remained active when coapplied to Centaurea maculosa with the herbicides 2,4-D or glyphosate (0.13 to 2.58 kg ai ha⁻¹), causing foliar necrosis prior to the herbicides killing Centaurea maculosa. An increase in the organosilicone surfactant concentration from 1 to 2 ml ai L⁻¹ was required to achieve levels of Nep1-induced necrosis on Centaurea maculosa acclimated to direct sun comparable to levels achieved on greenhouse-grown plants. Repeated application of Nep1 (6.48 g ai ha⁻¹) 3 wk after an initial treatment (6.48 g ai ha⁻¹) prevented the recovery of acclimated Centaurea maculosa. Greater damage was caused to acclimated Centaurea maculosa when Nep1 was applied near the middle of the day (80% necrosis at 10:00 A.M. and 85% necrosis at 2:00 P.M.) compared to early or late in the day (25% necrosis at 6:00 A.M. and 10% necrosis at 6:00 P.M.).
18 refs.
Language: English
English
Publication Type: Journal

Publication Type: Article
Country of Publication: United States
Classification: 92.10.1.5 CROP SCIENCE: Crop Physiology: Fertilizer effects
Classification: 92.11.1.2 PLANT PATHOLOGY AND SYMBIOSES: Plant Pathology: Fungi - general
Subfile: Plant Science

Beerling, D. J. The Use of Non-persistent Herbicides, Glyphosate, and 2,4-D Amine, to Control Riparian Stands of Japanese Knotweed (Reynoutria japonica Houtt.). GRO,POP. 10915: ENV,SOIL; 1990; 5, (5): 413-417.
Notes: EcoReference No.: 47411
Chemical of Concern: 24DXY,GYP

Blumenfeld, T.; Kleifeld, Y.; Herzlinger, G.; Bucsbaum, H., and Golan, S. Terminating Application of Herbicides in Drip-Irrigated Cotton. 1990; 18, (3): 265.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM ABSTRACT EUPHORBIA-GENICULATA ABUTILON-THEOPHRASTI XANTHIUM-SP SOLANUM-NIGRUM AMARANTHUS-SP WEED CONTROL WATER MOVEMENT MECHANICAL CULTIVATION AMETRYN OXYFLUORFEN GLUFOSINATE AMMONIUM GLYPHOSATE
KEYWORDS: General Biology-Symposia
KEYWORDS: Biochemical Studies-General
KEYWORDS: Movement (1971-)
KEYWORDS: Toxicology-General
KEYWORDS: Plant Physiology
KEYWORDS: Agronomy-Weed Control
KEYWORDS: Soil Science-General
KEYWORDS: Pest Control
KEYWORDS: Tracheophyta
KEYWORDS: Amaranthaceae
KEYWORDS: Compositae
KEYWORDS: Euphorbiaceae
KEYWORDS: Malvaceae
KEYWORDS: Solanaceae
LANGUAGE: eng

Boyd, R. S. and Miller, J. H. Forest Herbicide Site Preparation Treatments Have Little Impact on Plant Diversity 11 Years Posttreatment. 1997; 78, (4 suppl.): 58.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM MEETING ABSTRACT PINUS-TAEDA TERRESTRIAL ECOLOGY BIODIVERSITY PESTICIDES HEXAZINONE FUNGICIDE GLYPHOSATE TRICLOPYR DICAMBA PICLORAM HERBICIDE TREATMENT FORESTRY METHOD GEORGIA USA

KEYWORDS: General Biology-Symposia
KEYWORDS: Ecology
KEYWORDS: Forestry and Forest Products
KEYWORDS: Pest Control
KEYWORDS: Coniferopsida
LANGUAGE: eng

Boydston, R. A. Volunteer Potato Control in Field Corn. 1996; 73, (8): 345.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM MEETING ABSTRACT POTATO FIELD CORN VOLUNTEER PLANTS WEED CROP PEST MANAGEMENT AGRONOMY GLYPHOSATE HERBICIDE ATRAZINE DICAMBA
KEYWORDS: General Biology-Symposia
KEYWORDS: Agronomy-Grain Crops
KEYWORDS: Agronomy-Weed Control
KEYWORDS: Pest Control
KEYWORDS: Gramineae
KEYWORDS: Solanaceae
LANGUAGE: eng

Bradley, C. A.; Hart, S. E., and Pedersen, W. L. Interaction of Rhizoctonia Disease of Soybeans and Four Postemergence Herbicides on Four Soybean Cultivars in the Greenhouse. 1997; 87, (6 suppl.): S11.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM MEETING ABSTRACT RHIZOCTONIA-SOLANI SOYBEAN CULTIVAR-PIONEER 9364 CULTIVAR-PIONEER 9396 CULTIVAR-PIONEER 9344 CULTIVAR-PIONEER 9333 CROP PEST MANAGEMENT CROP INDUSTRY RHIZOCTONIA DISEASE AGRONOMY GLYPHOSATE POSTEMERGENCE HERBICIDE ACIFLUORFEN IMAZETHAPYR THIFENSULFURON PATHOGEN-HERBICIDE INTERACTION FUNGAL DISEASE
KEYWORDS: General Biology-Symposia
KEYWORDS: Agronomy-Oil Crops
KEYWORDS: Phytopathology-Diseases Caused by Fungi
KEYWORDS: Pest Control
KEYWORDS: Fungi Imperfecti or Deuteromycetes
KEYWORDS: Leguminosae
LANGUAGE: eng

Brown, J.; Thill, D. C.; Brown, A. P., and Brammer, T. A. Gene Transfer Between Genetically Engineered Canola Brassica Napus L. And Related Weed Species. 1996; 83, (6 suppl.): 55.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM MEETING ABSTRACT BRASSICA-NAPUS BRASSICA-RAPA

BRASSICA-KABER BRASSICA-NIGRA CANOLA FIELD MUSTARD WILD MUSTARD BLACK MUSTARD GENETICALLY ENGINEERED ORGANISM WEED GLYPHOSATE RESISTANCE HERBICIDES SULFONYLUREA IMAZETHAPYR GLUFOSINATE RESISTANT LINES HYBRIDIZATION TRANSGENE MOVEMENT GENE TRANSFER POLLEN MOVEMENT SEED TRANSPORT WIND ECOSYSTEM BACKCROSSING ENVIRONMENTAL RISK ASSESSMENT HYBRID VIGOR AGRONOMY POPULATION GENETICS PEST MANAGEMENT PACIFIC NORTHWEST USA
KEYWORDS: General Biology-Symposia
KEYWORDS: Genetics and Cytogenetics-Plant
KEYWORDS: Genetics and Cytogenetics-Population Genetics (1972-)
KEYWORDS: Ecology
KEYWORDS: Plant Physiology
KEYWORDS: Agronomy-Oil Crops
KEYWORDS: Agronomy-Weed Control
KEYWORDS: Cruciferae
LANGUAGE: eng

Clewis, S. B.; Wilcut, J. W., and Porterfield, D. Weed Management with S-Metolachlor and Glyphosate Mixtures in Glyphosate-Resistant Strip- and Conventional-Tillage Cotton (Gossypium hirsutum L.). 2006; 20, (1): 232-241.
Notes: Chemical of Concern: MTC,GYP

Crawford, M. C. and Simpson, R. J. Manipulation of the Feeding Value of Senescing Annual Ryegrass (Lolium rigidum Gaud.) with Imazethapyr and Glyphosphate. GRO,POPSOIL,ENV; 1993; 44, (7): 1653-1666.
Notes: EcoReference No.: 97082
Chemical of Concern: GYPI,IZT

Davison, J. G. and Bailey, J. A. The Response of Convolvulus arvensis (Bindweed) to 2,4-D, MCPA, MCPB, Dichlorprop, Mecoprop, 2,4,5-T, Dicamba and Glyphosate at Various Doses and Application Dates. POP,GROSOIL,ENV; 1974; 12, 641-648.
Notes: EcoReference No.: 41744
Chemical of Concern: 24DXY,MCPA,MCPB,DPP1,MCPP1,DMB,GYP

Derr, J. F. Biological Assessment of Herbicide Use in Apple Production I. Background and Current Use Estimates. 2001; 11, (1): 11-19.
Notes: Chemical of Concern: GYP
Abstract: LYNDON Descriptors: Weed control
Descriptors: Tree fruit
Descriptors: Pesticide impact
Descriptors: Malus domestica
Abstract: Weed management is an important concern for apple producers. Weeds compete with fruit trees for water, nutrients, light and pollination by insects. Weed competition can dramatically reduce apple tree (Malus

domestica Borkh.) growth and yield. Weed control practices can impact rodent populations, and insect and disease management in orchards. Use of cultivation can increase soil erosion. Mulches are too expensive for use in orchards and can increase rodent problems. Weeds are generally controlled within the row using herbicides while a grass sod is often used in row middles for erosion control. The most commonly used postemergence herbicides in apples are glyphosate, paraquat, and 2,4-D. Simazine is the most commonly used preemergence herbicide.
39 refs.
Language: English
English
Publication Type: Journal
Publication Type: Review
Country of Publication: United States
Classification: 92.10.4 CROP SCIENCE: Crop Protection
Classification: 92.10.2.5 CROP SCIENCE: Agronomy and Horticulture: Fruit and nuts
Subfile: Plant Science

Flint, C. E. and Lea, H. V. The Chemical Control of Bracken Pteridium-Aquilinum a Review of Some Agricultural Development and Advisory Service Field Experiments. 1985; 0, (0): 137-146.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM GLYPHOSATE CHLORSULFURON METSULFURON-METHYL AMINOTRIAZOLE ASULAM DICAMBA HERBICIDE UK
KEYWORDS: General Biology-Symposia
KEYWORDS: Agronomy-Forage Crops and Fodder
KEYWORDS: Agronomy-Weed Control
KEYWORDS: Pest Control
KEYWORDS: Filices
LANGUAGE: eng

Gimenez, A. E.; York, A. C.; Wilcut, J. W., and Batts, R. B. Annual Grass Control by Glyphosate plus Bentazon, Chlorimuron, Fomesafen, or Imazethapyr Mixtures. Department of Crop Science,North Carolina State University,Raleigh,NC: 1998; 12, (1): 134-136.
Notes: Chemical of Concern: FSF,GYP

Grenoble, D. W. and Orzolek, M. D. Weed Control in Reduced Tillage Pumpkins. 1986; 21, (3 sect. 1): 370.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM ABSTRACT GLYPHOSATE DICAMBA DIMETHAZONE BANVEL YIELD CROP INDUSTRY
KEYWORDS: General Biology-Symposia
KEYWORDS: Biochemical Studies-General

KEYWORDS: Plant Physiology
KEYWORDS: Plant Physiology
KEYWORDS: Agronomy-Weed Control
KEYWORDS: Horticulture-Vegetables
KEYWORDS: Pest Control
KEYWORDS: Cucurbitaceae
LANGUAGE: eng

Harikrishnan, R. and Yang, X. B. Effect of Herbicides on Mycelial Growth Sclerotial Production and Viability of Rhizoctonia Solani Under in Vitro Conditions. 1998; 88, (9 suppl.): S36.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM MEETING ABSTRACT RHIZOCTONIA-SOLANI PATHOGEN MYCELIAL GROWTH SCLEROTIAL PRODUCTION FUNGAL VARIABILITY IN VITRO CONDITIONS PENDIMETHALIN HERBICIDE IMAZETHAPYR GLYPHOSATE SURVIVAL TOXICOLOGY PEST MANAGEMENT PESTICIDES
KEYWORDS: General Biology-Symposia
KEYWORDS: Plant Physiology
KEYWORDS: Plant Physiology
KEYWORDS: Phytopathology-Diseases Caused by Fungi
KEYWORDS: Phytopathology-Nonparasitic Diseases
KEYWORDS: Pest Control
KEYWORDS: Fungi Imperfecti or Deuteromycetes
LANGUAGE: eng

Hopen, H. J. Overview of Herbicides Available for Cabbage Production in Illinois and Wisconsin for Thirty Years 1965-1994. 1994; 29, (5): 471.
Notes: Chemical of Concern: GYP
Abstract: Ab - biosis copyright: biol abs. Rrm abstracts only plant horticulture herbicide clomazone dcpa glyphosate metolachlor napropamide sethoxydim trifluralin oxyfluorfen paraquat pyridate usa
KEYWORDS: General Biology-Symposia
KEYWORDS: Biochemical Studies-General
KEYWORDS: Agronomy-Weed Control
KEYWORDS: Horticulture-Vegetables
KEYWORDS: Pest Control
KEYWORDS: Cruciferae
LANGUAGE: eng

Horowitz, M. Rorippa-Prostrata a New Weed in Flower Crops. 1990; 18, (3): 254.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM ABSTRACT GROWTH RATE 2 4-D GLYPHOSPHATE OXYFLUORFEN PRONAMIDE ORYZALIN OXADIAZON HERBICIDE IMPORTED WEED THE NETHERLANDS ISRAEL

KEYWORDS: General Biology-Symposia
KEYWORDS: Biochemical Studies-General
KEYWORDS: Toxicology-General
KEYWORDS: Plant Physiology
KEYWORDS: Agronomy-Weed Control
KEYWORDS: Horticulture-Flowers and Ornamentals
KEYWORDS: Pest Control
KEYWORDS: Chenopodiaceae
KEYWORDS: Cruciferae
LANGUAGE: eng

Hoss, N. E.; Al-Khatib, K.; Peterson, D. E., and Loughin, T. M. Efficacy of Glyphosate, Glufosinate, and Imazethapyr on Selected Weed Species. 2003; 51, (1): 110-117.
Notes: Chemical of Concern: GYP

Johnson, W. G.; Dilbeck, J. S.; DeFelice, M. S., and Kendig, J. A. Weed Control with Reduced Rates of Chlorimuron plus Metribuzin and Imazethapyr in No-Till Narrow-Row Soybean (Glycine max). POPSOIL,ENV,MIXTURE; 1998; 12, 32-36.
Notes: EcoReference No.: 70988
Chemical of Concern: GYP,MBZ,DMM

Kennedy, E. R. The Impact of the Herbicides Glyphosate and 2,4-D on Moose Browse in Conifer Plantations in Northeastern Minnesota. POP,MORSOIL,ENV; 1986: 37 p.
Notes: EcoReference No.: 75932
Chemical of Concern: GYPI,24D

Lavy, T. L.; Mattice, J. D., and Massey, J. H. Evaluation of Worker Exposure to Multiple Pesticides. 1990; 199, (1-2): Agro 21.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM ABSTRACT CONIFER NURSERY BENOMYL BIFENOX CAPTAN CARBARYL CHLORPYRIFOS GLYPHOSATE TRIADIMEFON CHLOROTHALONIL DIAZINON DIPHENAMIDE FENVALERATE METALAXYL NAPROPAMIDE OXYFLUORFEN BIOLOGICAL MONITORING
KEYWORDS: General Biology-Symposia
KEYWORDS: Biochemical Studies-General
KEYWORDS: Toxicology-Environmental and Industrial Toxicology
KEYWORDS: Public Health: Environmental Health-Air
KEYWORDS: Public Health: Environmental Health-Radiation Health
KEYWORDS: Forestry and Forest Products
KEYWORDS: Pest Control
KEYWORDS: Economic Entomology-Chemical and Physical Control
KEYWORDS: Coniferopsida

LANGUAGE: eng

Lowcock, L. A., Sharbel, T. F., Bonin, J., Ouellet, M., Rodrigue, J., and DesGranges, J. L. (1997). Flow Cytometric Assay for In Vivo Genotoxic Effects of Pesticides in Green Frogs (Rana clamitans). *Aquat.Toxicol.* 38: 241-255.

Chem Codes: EcoReference No.: 83840

Chemical of Concern: ATZ,PRT,CTN,LNR,GYP Rejection Code: MIXTURE.

Lym, R. G. Leafy Spurge (Euphorbia esula) Control with Glyphosate plus 2,4-D. ACC. Prof. R.G. Lym, Plant Sciences Dept., North Dakota State University, Fargo, ND 58105: SOIL,ENV,MIXTURE; 2000; 53, (1): 68-72.
Notes: EcoReference No.: 64819
Chemical of Concern: GYP,DMB

Moore, J. Doublegee Emex Australis in the Great Southern Areas of Western Australia. 1996; 11, (4): 145.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM MEETING ABSTRACT EMEX-AUSTRALIS DOUBLEGEE WEED PEST MANAGEMENT HORTICULTURE GLYPHOSATE HERBICIDE PARAQUAT DICAMBA BROADSTRIKE SOUTHERN AREAS WESTERN AUSTRALIA AUSTRALIA
KEYWORDS: General Biology-Symposia
KEYWORDS: Agronomy-Weed Control
KEYWORDS: Horticulture-General
KEYWORDS: Pest Control
KEYWORDS: Polygonaceae
LANGUAGE: eng

Pombo, G.; Orzolek, M. D.; Tukey, L. D., and Pyzik, T. P. The Effect of Paclobutrazol, Daminozide, Glyphosate and 2,4-D in Gel on the Emergence and Growth of Germinated Tomato Seeds. GROSOIL,ENV; 1985; 60, (3): 353-357.
Notes: EcoReference No.: 31469
Chemical of Concern: GYP,24DXY,PBZ

Ramaprabhu, T.; Chakrabarty, N. M.; Raghavan, S. L., and Kumariah, P. Potential of Glyphosate and 2,4-D DMA for Aquaphyte Management in India. POP,MORWATER,AQUA; 1991: 114-116.
Notes: EcoReference No.: 14164
Chemical of Concern: 24DXY,GYP

Richman, S. J.; Walker, C. A., and Lee, S. M. Capillary Electrophoresis Exploring a New Analytical Tool for Pesticide Residue Analysis . 1995; 210, (1-2): Agro 2.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM MEETING ABSTRACT CORN WHEAT IMAZETHAPYR PARAQUAT

SULFONYLUREA PESTICIDES GLYPHOSATE PHENOXY ACID HERBICIDES CHROMATOGRAPHY ANALYTICAL METHOD AGROCHEMISTRY
KEYWORDS: General Biology-Symposia
KEYWORDS: Biochemical Studies-General
KEYWORDS: Biophysics-General Biophysical Techniques
KEYWORDS: Biophysics-Molecular Properties and Macromolecules
KEYWORDS: Agronomy-Grain Crops
KEYWORDS: Agronomy-Weed Control
KEYWORDS: Pest Control
KEYWORDS: Gramineae
LANGUAGE: eng

Ross, D. W., Berisford, C. W., and Godbee, J. F. Jr. (1990). Pine Tip Moth, Rhyacionia spp., Response to Herbaceous Vegetation Control in an Intensively Site-Prepared Loblolly Pine Plantation. *For.Sci.* 36: 1105-1118.

Chem Codes: Chemical of Concern: SMU,GYP,HXZ Rejection Code: MIXTURE.

Sanogo, S.; Scherm, H.; Peters, C. M., and Yang, X. B. Response of Fusarium Solani F. Sp Glycines to Herbicides and Development of Sudden Death Syndrome in Glyphosate-Tolerant Soybean. 1997; 87, (6 suppl.): S85.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM MEETING ABSTRACT FUSARIUM-SOLANI-F-SP-GLYCINES SOYBEAN PHYTOPATHOGEN HOST INFECTION PEST MANAGEMENT CROP PESTS IMAZETHAPYR HERBICIDE PENDIMETHALIN GLYPHOSATE LACTOFEN SUDDEN DEATH SYNDROME CROP TOLERANCE AGRONOMY TOXICOLOGY DISEASE PREDISPOSITION FUNGAL DISEASE
KEYWORDS: General Biology-Symposia
KEYWORDS: Toxicology-General
KEYWORDS: Agronomy-Oil Crops
KEYWORDS: Phytopathology-Diseases Caused by Fungi
KEYWORDS: Phytopathology-Nonparasitic Diseases
KEYWORDS: Phytopathology-Parasitism and Resistance
KEYWORDS: Pest Control
KEYWORDS: Fungi Imperfecti or Deuteromycetes
KEYWORDS: Leguminosae
LANGUAGE: eng

Sanogo, S. and Yang, X. B. Effect of Selected Herbicides on Conidial Production and Germination and Mycelial Growth of Fusarium Solani F. Sp. Glycines. 1998; 88, (9 suppl.): S113-s114.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM MEETING ABSTRACT FUSARIUM-SOLANI-F-SP-GLYCINES PLANT

PATHOGEN AGRONOMY PEST MANAGEMENT SOYBEAN SUDDEN DEATH SYNDROME IMAZETHAPYR CONIDIAL PRODUCTION CONIDIAL GERMINATION MYCELIAL GROWTH HERBICIDE PENDIMETHALIN LACTOFEN GLYPHOSATE FUNGAL DISEASE
KEYWORDS: General Biology-Symposia
KEYWORDS: Plant Physiology
KEYWORDS: Plant Physiology
KEYWORDS: Agronomy-Oil Crops
KEYWORDS: Phytopathology-Diseases Caused by Fungi
KEYWORDS: Pest Control
KEYWORDS: Fungi Imperfecti or Deuteromycetes
LANGUAGE: eng

Sanogo, S.; Yang, X. B.; Hartzler, R., and Whigham, K. Herbicide Application and Development of Sudden Death Syndrome in Roundup Ready Soybean Under Field Conditions. 1998; 88, (9 suppl.): S78.
Notes: Chemical of Concern: GYP
Abstract: CAROLYN ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS. RRM MEETING ABSTRACT SOYBEAN HOST PLANT ROUNDUP READY INFECTION AGRONOMY SUDDEN DEATH SYNDROME DIMETHENAMID PREEMERGENCE HERBICIDE ACIFLUORFEN POSTEMERGENCE HERBICIDE IMAZETHAPYR GLYPHOSATE LACTOFEN FUNGAL DISEASE
KEYWORDS: General Biology-Symposia
KEYWORDS: Agronomy-Oil Crops
KEYWORDS: Phytopathology-Diseases Caused by Fungi
KEYWORDS: Pest Control
KEYWORDS: Leguminosae
LANGUAGE: eng

Sassaman, J. F.; Pienta, R.; Jacobs, M.; Cioffi, J., and Mitre Corp., McLean, VA (USA). Pesticide Background Statements. Volume 1. Herbicides. 1984.
Notes: Chemical of Concern: GYP
Abstract: CAROLYN Descriptors: Article Subject Terms: chemical properties
Descriptors: chemical speciation
Descriptors: toxicology
Descriptors: fate
Descriptors: pollution effects
Descriptors: environmental impact
Descriptors: herbicides
Descriptors: hazard assessment
Abstract: The individual Herbicide Background Statements have been compiled to provide a comprehensive review of the available information concerning the use, chemistry, toxicology, environmental fate, and comparative hazard of the herbicides in forest applications. References to

the published literature at the end of each background statement are provided for those individuals who wish to independently evaluate the toxicological data and environmental fate information that is presented in summary form. In many instances, secondary sources, such as review articles, handbooks, and company technical data sheets, were used. Wherever possible in these instances, the primary source was also indicated and referenced, although it may not have been examined. Herbicides included in the document are: amitrole, atrazine, 2,4-D, 2,4-DP, dalapon, dicamba, fosamine ammonium, glyphosate, hexazinone, picloram, simazine, and triclopyr. [See also PB89-226690 and Volume 2, PB89-226708. Sponsored by Forest Service, Washington, DC.] (DBO)
Other numbers: AGRICULTURE/HB-633
Language: English
English
Publication Type: Report
Classification: Q5 01503 Characteristics, behavior and fate
Subfile: ASFA 3: Aquatic Pollution & Environmental Quality

Starke, R. J. and Oliver, L. R. Interaction of Glyphosate with Chlorimuron, Fomesafen, Imazethapyr, and Sulfentrazone. Department of Agronomy,University of Arkansas,Fayetteville,AR: 1998; 46, (6): 652-660.
Notes: Chemical of Concern: FSF,GYP

Thomas, M. W., Judy, B. M., Lower, W. R., Krause, G. F., and Sutton, W. W. (1990). Time-Dependent Toxicity Assessment of Herbicide Contaminated Soil Using the Green Alga Selenastrum capricornutum. *Environ.Res.* 235-254.

Chem Codes: Chemical of Concern: GYPI,IZP,HXZ Rejection Code: MIXTURE.

Wan, M. T.; Watts, R. G., and Moul, D. J. Acute Toxicity to Juvenile Pacific Northwest Salmonids of Basacid Blue NB755 and Its Mixture with Formulated Products of 2,4-D, Glyphosate, and Triclopyr.
MORWATER,AQUA,MIXTURE; 1991; 47, (3): 471-478 (OECDG Data File).
Notes: EcoReference No.: 5132
Chemical of Concern: 24DXY,GYP,TPR,AQS

Wang, Y. S.; Jaw, C. G., and Chen, Y. L. Accumulation of 2,4-D and Glyphosate in Fish and Water Hyacinth. ACCWATER,AQUA; 1994; 74, (3/4): 397-403.
Notes: EcoReference No.: 14516
Chemical of Concern: 24DXY,GYP

Wester, R. C.; Melendres, J.; Serranzana, S., and Maibach, H. I. Time-Response Necessary in Validation for Extraction of Pesticides From Cloth Patches Used in Field Exposure Studies. 1994; 27, (2): 276-280.
Notes: Chemical of Concern: GYP
Abstract: ABSTRACT: BIOSIS COPYRIGHT: BIOL ABS.

Environmental exposure in field studies is generally monitored by the cloth patch technique. Many investigators question the accuracy of the technique, in part due to lack of validation. The objective was to examine extraction of chemicals from cloth patches for potential technique validation. Chemicals studied were glyphosate, atrazine, malathion, alachlor and 2,4-dichlorophenoxy acetic acid (2,4-D), a selection of hydrophilic (glyphosate) and varying lipophilic compounds. The 14C-radiolabeled chemical was applied to a cotton patch (two types used) and solvent extracted over a 48-h time period. The chemical was soluble in the application solvent and in the extraction solvent. Extraction was near 100% at time 0 h, but statistically ($P < 0.05$ or greater) decreased to levels of 20-50% by 48 h. The missing chemical was detected in cloth residue and accountability was always excellent. The chemicals exhibited a time-response by incorporating into the cotton patch and no
KEYWORDS: Mathematical Biology and Statistical Methods
KEYWORDS: Biochemical Studies-General
KEYWORDS: Toxicology-Environmental and Industrial Toxicology
KEYWORDS: Public Health: Environmental Health-Air
KEYWORDS: Pest Control
LANGUAGE: eng

Wiese, A. F.; Wood, M. L., and Chenaulf, E. W. Weed Control with Glyphosate-2,4-D Mixture. 1988; 41, 104-113.
Notes: Chemical of Concern: GYP

Wyrill III, J. B. and Burnside, O. C. Absorption, Translocation and Metabolism of 2,4-D and Glyphosate in Common Milkweed and Hemp Dogbane. 1976; 24, 557-566.
Notes: EcoReference No.: 30778
Chemical of Concern: GYP,24DXY

Yarborough, D. E. and Ismail, A. A. Barrenberry Control in Lowbush Blueberry Fields Through Selective Application of 2,4-D and Glyphosate.
POP,GRO,REPSOIL,ENV; 1979; 104, (6): 786-789.
Notes: EcoReference No.: 43040
Chemical of Concern: 24DXY,G0YP,GYP

Yarborough, D. E.; Ismail, A. A., and Hepler, P. R. Effect of Contact Application of Glyphosate and 2,4-D on Black Barrenberry (Aronia melanocarpa) Under Greenhouse Conditions. CEL,PHYTOP; 1979; 104, 742-745.
Notes: EcoReference No.: 43043
Chemical of Concern: 2