MATERIAL SAFETY DATA SHEET :
SUPER LAWNWEEDER

Reg no: L 4370 (Act no. 36 of 1947)	**Date issued:** 1998/07/30

COMPANY DETAILS	
Name: Enviro Weed Control Systems	**Emergency tel no :** Poison Centre (Unitas Hospital): (012) 664 1100 or Toll-free: 0800 111 229 Tygerberg: (021) 931 6129 Red Cross: (021) 689 5227
Physical Address: 5 NEON ROAD / NEONWEG FULCRUM SPRINGS 1559 ☎ (011) 817-2822 (011) 813-1260 ✉ 13031 GEDULD 1562	**Postal Address:** PO Box 13031 Geduld 1562
E-mail: enviro@enviroweed.co.za	
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1. PRODUCT AND COMPANY IDENTIFICATION	
Trade name: Super Lawnweeder	**Chemical abstract no:** Not available
Chemical family: MCPA & 2,4-D: Auxin type herbicides; Chlorophenoxy compound. Dicamba: Substituted benzoic acid	**NIOSH no:** Not Available
Chemical name: Dicamba: Dicamba-dimethylamine salt 2,4-D: (2,4-dichlorophenoxy) acetic acid MCPA: [(4-chloro-2-methylphenoxy) acetic acid]	**Hazchem code:** 2X **Reg. L:** 4370 (Act no. 36 of 1947)
Synonyms: Dicamba: Banvel	**UN no:** 3000

2. COMPOSITION

Hazardous components:

Dicamba (dimethylamine salt)	120,0 g/ℓ
2,4-D (phenoxy derivative - dimethylamine salt)	180,0 g/ℓ
MCPA (phenoxy derivative - dimethylamine salt)	157,5 g/ℓ

EEC classification: Not available

R Phrases: Risk of serious damage to eyes.
Harmful in contact with skin.
Harmful if swallowed.

3. HAZARDS IDENTIFICATION

Main hazard: Extremely irritating and corrosive to eyes of rabbits. Risk of serious damage to eyes.

Flammability: Slight fire hazard when exposed to heat or flame.

Chemical hazard: Phytotoxicity to adjoining crops because of drift.

Biological hazard: Possible risk of groundwater contamination at point sources, such as loading, mixing and disposal sites.

Reproductive hazard: Dicamba is suspected of being a human teratogen. No direct and conclusive evidence of reproductive problems associated with 2,4-D or MCPA in humans exists.

Eye effects: eyes:
Dicamba: Extremely irritating and corrosive to eyes. Get medical aid. Flush with running tap water for at least 15 minutes. See in section 11: "Skin and eye contact"
2,4-D: Irritating to eyes.
MCPA: Risk of serious damage to eyes. Causes irreversible eye damage.

Health effects: skin:
Dicamba: Moderately irritating to skin (rabbits). Moderate skin sensitiser (guinea pigs). Acute dermal LD_{50} (rabbit) > 2000 mg/kg.
2,4-D: Harmful in contact with skin. Skin and eye irritant (rabbits). Not a skin sensitiser (guinea pigs). 2,4-D has produced serious eye and skin irritation among agricultural workers.
MCPA: Harmful in contact with skin. May cause sensitization by inhalation. Acute dermal LD_{50} (rat) > 1000 mg/kg.

Health effects: ingestion:
Dicamba: Acute oral LD_{50} (rat) = 1707 mg/kg
2,4-D: Harmful if swallowed. Acute oral LD_{50} (rat) = 375 mg/kg; mice 138 mg/kg.
MCPA: Acute oral LD_{50} (rat) = 700 mg/kg, mice 550 mg/kg. The estimated human lethal oral dose is from 250 to 450 mg/kg.

Health effects: inhalation:
Dicamba: LC_{50} (4 h) for rats > 9.6 mg/ℓ
2,4-D: LC_{50} (24 h) for rats > 1.79 mg/ℓ
MCPA: LC_{50} (4 h) for rats > 6.36 mg/ℓ May cause sensitization by inhalation.

Carcinogenicity: Dicamba: Data from laboratory studies are inadequate for EPA to determine if dicamba can increase the risk of cancer in humans.
2,4-D: In humans, a variety of studies give conflicting results. There remains considerable controversy about the methods used in the various studies and thus with the results of the various studies. Investigations are continuing.
MCPA: All of the available cancer evidence on MCPA indicates that the compound does not cause cancer.

Mutagenicity: See section 11.

Neurotoxicity: Accidental human poisoning with 2,4-D, which resulted in severe neurotoxicity, has been reported.

4. FIRST AID MEASURES

Product in eye: Flush immediately with clear clean running water for at least 15 minutes. Hold eyelids apart to rinse the entire surface of the eye and lids. If eye symptoms (redness, irritation or pain) persist refer patient to ophthalmologist for examination of eye. Risk of serious damage to eyes.

Product on skin: Wash skin with fresh running water and soap, including hair and under fingernails. Remove contaminated clothing and wash before reuse. Treat symptomatically.

Product ingested: Dicamba: Induce emesis. 2,4-D: Do not induce vomiting unless advised by a physician. The most characteristic signs of severe 2,4-D poisoning in animals are those of myotonia (muscle spasms). MCPA: Do not induce vomiting unless advised by a physician.

Product inhaled: Move victim from contaminated area to fresh air. Apply artificial respiration if necessary. Treat symptomatically.

5. FIRE FIGHTING MEASURES

Extinguishing media: Dry chemical, carbon dioxide or standard foam.

Special hazards: Avoid breathing vapours. Keep up-wind. Fight fire from maximum distance. Beware of toxic fumes. Dyke fire water for later disposal. Remove containers from fire at first safe opportunity.

Protective clothing: Wear protective clothing. In case of major fires, wear a self contained breathing apparatus.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions: Wear protective clothing. Avoid breathing vapours or spray drift. If necessary, wear a self-contained breathing apparatus.

Environmental precautions: Dangerous to fish. Do not contaminate ponds, waterways or ditches with chemical or used container. Do not allow to enter drainage systems, surface or ground water. If the product enters watercourses or sewers or contaminate soil or plants, inform competent authority.

Small spills: Do not wash into sewer. If spills occur, contain the spill by using an absorbent material (e.g, sand, sawdust, earth or synthetic absorbent). Dispose of the contaminated absorbent material by placing in a plastic bag and following disposal instructions on this MSDS.

Large spills: Large spillages should be dammed-off and pumped into containers; soak up remainder and dispose of in accordance with local regulations. Do not wash into sewer. Do not flush spilled material into sewer or drains. Keep spectators away.

7. HANDLING AND STORAGE

Suitable material: Do not mix, store or apply in galvanized or unlined mild steel containers or spray tanks. The product can react with such containers and tanks or produce hydrogen gas which may form a highly combustible mixture that can flash or explode if ignited by open flame, spark, welder's torch, lighted cigarette or other ignition source.

Handling/ Storage precautions: Store at temperature not exceeding 40°C. Harmful if swallowed. Avoid contact with skin, eyes and clothing. Store in sealed original containers, in a well-aired, fresh and dry storehouses or in shaded and possibly well-aired places. Keep away from direct sunlight, food, seed, animals, children and uninformed persons. Do not leave spray solution in spray tanks for long periods.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure limits:
Dicamba: ADI (acceptable daily intake) = not available; TWA 200 ℓ; TWA 1000 mℓ/min; TWA 3.3 hrs.
2,4-D: ADI = 0.3 mg / kg body weight / day.
MCPA: ADI = 0.0015 mg / kg body weight / day

Engineering control measures: Use outdoors in a well ventilated area. The mixing and loading of spray mixtures into the spray equipment must be carried out on an impervious pad (i.e., concrete slab, plastic sheeting) large enough to catch any spilled material. If spills occur, contain the spill by using an absorbent material (e.g, sand, earth or synthetic absorbent). Dispose of the contaminated absorbent material by placing in a plastic bag and following disposal instructions on this MSDS.

Personal protection - respiratory: Avoid inhaling fumes or spray drift.

Personal protection - hand: Protective waterproof (impermeable) and chemical resistant gloves.

Personal protection - eye: Wear eye protection. Safety glasses. Risk of irreversible damage to eyes.

Personal protection - skin: Protective clothing. Long-sleeved shirt, long pants, shoes plus socks, protective waterproof (impermeable) chemical resistant gloves.

Other protection: Take extreme care to avoid drift. Do not eat, drink or smoke while handling this product. Prevent contamination of food, feeds, drinking water and eating utensils. After using this product wash hands and face before eating, chewing gum, smoking, drinking or using the toilet. Wash accurately (preferably a shower) after work shift. Wash hands during breaks and at the end of the work with soap and water. Remove clothing immediately if pesticide gets inside; then wash thoroughly and put on clean clothing.

Remove personal protective equipment immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Dark-brown soluble concentrate with strong phenolic cresylic odour.

Odour: Phenolic cresylic odour.

pH: Not available.	
Boiling point: Not available	**Autoflammability:** Not Applicable
Melting point: Dicamba: 114 - 116°C 2,4-D:138°C MCPA: 118 - 119°C	**Explosive properties:** Not explosive
Flash point: Dicamba: 199°C 2,4-D: MCPA:	**Oxidizing properties:** Dicamba: Mildly to non-corrosive. MCPA : It is a acid and will corrode metals.
Flammability: Slight fire hazard when exposed to heat or flame.	
Vapour pressure: Not available.	
Density: Not available	
Solubility - water: Dicamba: 720 g acid equivalent /ℓ (25°C). Highly soluble. 2,4-D: 3 kg/ℓ (20°C) MCPA: 734 mg/ℓ (25°C)	
Solubility - solvent: Dicamba: ethanol 922 g/ℓ; cyclohexanone 916 g/ℓ; acetone 810 g/ℓ; 2,4-D: soluble in alcohols and acetone. Insoluble in kerosene and diesel oil. MCPA: ethanol 1530 g/ℓ; diethyl ether 770 g/ℓ; xylene 49 g/ℓ.	
Solubility - coefficient: Not available	
Neurotoxicity: Accidental human poisoning with 2,4-D, which resulted in severe neurotoxicity, has been reported.	

10.	STABILITY AND REACTIVITY
Conditions to avoid: Avoid sources of heat, free flames or spark generating equipment.	
Incompatible materials: No known incompatible materials.	
Hazardous decomposition products: Products of combustion : May yield steam, Dicamba ammine salt, HCL, organochloride products, oxides of nitrogen, carbon monoxide.	

11. TOXICOLOGICAL INFORMATION

Acute toxicity:

Dicamba: Dicamba is moderately toxic by ingestion and slightly toxic by inhalation or dermal exposure. Symptoms of poisoning with dicamba include loss of appetite (anorexia), vomiting, muscle weakness, slowed heart rate, shortness of breath, central nervous system effects (victim may become excited or depressed), benzoic acid in the urine, incontinence, cyanosis (bluing of the skin and gums), and exhaustion following repeated muscle spasms. In addition to these symptoms, inhalation can cause irritation of the linings of the nasal passages and the lungs, and loss of voice. Most individuals who have survived severe poisoning from dicamba have recovered within 2 to 3 days with no permanent effects

2,4-D: In humans, prolonged breathing of 2,4-D causes coughing, burning, dizziness, and temporary loss of muscle coordination. Symptoms of poisoning can be fatigue and weakness with perhaps nausea. On rare occasions there can be inflammation of the nerve endings with muscular effects following high levels of exposure.

MCPA: Symptoms in humans from acute toxic exposure include slurred speech, twitching, jerking and spasms, drooling, low blood pressure, and unconsciousness. The estimated human lethal oral dose is from 250 to 450 mg/kg.

Skin and eye contact:

Dicamba: Moderately irritating to skin (rabbits). Moderate skin sensitiser (guinea pigs). Acute dermal LD_{50} (rabbit) > 2000 mg/kg. Dicamba is very irritating and corrosive and can cause severe and permanent damage to the eyes. Running water should be flushed through the eyes for at least 15 minutes if any dicamba is splashed into them. The eyelids may swell and the cornea may be cloudy for a week after dicamba is splashed in the eyes. Eye irritation in rabbits: Induced corrosiveness of conjunctival tissues and corneal injury which was reversible in 72 hours. In a recent study, eye damage was irreversible and pannus was observed.

In some individuals, dicamba is a skin sensitizer. It may cause skin burns. There is no evidence that dicamba is absorbed into the body through the skin.

2,4-D: Harmful in contact with skin. Skin and eye irritant (rabbits). Not a skin sensitiser (guinea pigs). Irritating to eyes.

MCPA: Harmful in contact with skin. May cause sensitization by inhalation. Acute dermal LD_{50} (rat) > 1000 mg/kg. Risk of serious damage to eyes. Causes irreversible eye damage. Primary Eye Irritation. Toxicity Category I (corneal opacity with irritation of conjunctive observed 21 days post-instillation with rabbits).

Chronic toxicity:
Dicamba: Chronic exposure can lead to the development of the same symptoms as described for acute exposure. NOEL (no observable effect level)) - In 2 year feeding trials, no ill-effects were observed in rats receiving 500 mg/kg diet and dogs receiving 50 mg/kg diet .Dicamba was excreted rapidly by rats, mainly in the urine, when administered orally or subcutaneously. One to 4% was excreted in the faeces. Mice, rats, rabbits and dogs excreted 85% of an oral dose as unmetabolized dicamba in the urine within 48 hours of dosing. Eventually, between 90 and 99% of the dose was excreted unmetabolized in the urine. This indicates that dicamba is rapidly absorbed into the bloodstream from the gastrointestinal tract. Like most organic acids, dicamba is joined to glycine, or glucuronic acid in the liver. When dicamba was ingested daily in the feed, the concentrations in different organs reached a steady state within 2 weeks. When daily intake stopped, storage in the organs declined rapidly. It is therefore concluded that dicamba does not bio-accumulate in mammalian tissues. Following an attempted suicide with a mixture of dicamba and 2,4-D, dicamba levels in the blood serum and urine of the victim became undetectable within 2 weeks.
2,4-D: NOEL - In 2 year feeding trials, no ill-effects were observed in rats and mice receiving 1 mg/kg body weight.; ADI (JMPR) 0,3 mg/kg body weight. A human given a total of 16.3 grams in 32 days as "desperation therapy" lapsed into a stupor, showed signs of in-coordination, weak reflexes, and urinary incontinence. MCPA: NOEL - In 2 year feeding trials, no ill-effects were observed in rats (18 mg/kg mice) receiving 1.33 mg/kg body weight daily. Three ninety day studies of rats revealed chronic toxic effects at doses around 20 to 25 mg/kg/day. Growth retardation and increased kidney weight were the effects noted in all three studies. Another study of this type indicated that the lowest dose that caused chronic toxic effects in the rat was about 5 mg/kg/day. These levels are substantially below the LD_{50} values for the organism indicating that chronic toxicity can occur at low exposure levels. Humans excreted about half of a 5 mg dose in the urine within a few days. No residues were found after day five.

Carcinogenicity: Dicamba: Data from laboratory studies are inadequate for EPA to determine if dicamba can increase the risk of cancer in humans.
2,4-D: In humans, a variety of studies give conflicting results. There remains considerable controversy about the methods used in the various studies and thus with the results of the various studies. Investigations are continuing.
MCPA: All of the available cancer evidence on MCPA indicates that the compound does not cause cancer.

Mutagenicity: Dicamba: Dicamba has not been shown to be a mutagen
2,4-D: 2,4-D has been very extensively tested for mutagenicity and found to be non-mutagenic in most systems. 2,4-D did not damage DNA in human lung cells. The evidence is too equivocal to draw any conclusions.
MCPA: MCPA was only weakly mutagenic to bone marrow and ovarian cells of hamsters and negative results were reported for all other mutagenic tests. While another test has been requested by the EPA (a gene mutation study) it appears that the compound poses little mutagenic risk to humans.

Reproductive hazards: Dicamba: In a 3-generation study, dicamba did not affect the reproductive capacity of rats. EPA has set the NOAEL for this study at 3 mg/kg/day. Dicamba is suspected of being a human teratogen. No teratogenic effects have been shown in lab animals such as rabbits and rats. MCPA: A two-generation rat study at doses of up to 15 mg/kg affected reproductive function. Even smaller amounts of the compound were toxic to the fetuses. Dogs receiving relatively small amounts of MCPA (8 and 16 mg/kg) for 13 weeks had various adverse sperm and testes changes. No conclusions can be drawn about human birth defect risk from the currently available information. 2,4-D has a very limited ability to cause birth defects. No direct evidence of reproductive problems associated with 2,4-D exposure exists.

12. ECOLOGICAL INFORMATION

Aquatic toxicity - fish:
Dicamba: LC_{50} (96 h) for rainbow trout and bluegill sunfish: 135 mg/ℓ. Dicamba is of low toxicity to fish
2,4-D: LC_{50} (48 h) for rainbow trout: 1.1 mg/ℓ. Toxic to fish.
MCPA: LC_{50} (96 h) for rainbow trout: 232 mg/ℓ. MCPA is only slightly toxic to freshwater fish.

Aquatic toxicity - daphnia:
Dicamba: EC_{50} (48 h) for daphnia: 110 mg/ℓ.
2,4-D: EC_{50} (21 days) for daphnia: 235 mg/ℓ.
MCPA: EC_{50} (48 h) for daphnia: > 100 mg/ℓ. MCPA is practically non-toxic to freshwater invertebrates, and estuarine and marine organisms.

Aquatic toxicity - algae:
Dicamba: Not available
2,4-D: Not available
MCPA: Not available

Biodegradability:
Dicamba: In soil microbial degradation occurs, the principal metabolite being 3,6-dichlorosalicylic acid. Under conditions amenable to rapid metabolism, DT_{50} < 14 days. K_{oc} = 2. Metabolism by soil microorganisms is the major pathway of loss under most soil conditions. The rate of biodegradation increases with temperature and increasing soil moisture, and tends to be faster when soil is slightly acidic. When soil moisture increases above 50%, the rate of biodegradation declines.
2,4-D: In soil, microbial degradation involves hydroxylation, decarboxylation, cleavage of the acid side chain, and ring opening. Half-life in soil < 7 days. K_{oc} = c. 60. Soil microbes are primarily responsible for its disappearance in soil.
MCPA: In soil, degraded to 4-chloro-2-methylphenol, followed by ring hydroxylation and ring opening. DT_{50} < 7 days after initial "lag phase". Duration of residual activity in soil is c. 3-4 months, following an application rate of The organic content of soil determines in large part the persistence of MCPA. With less than 10% organic matter in soil, the compound is degraded in one day and, with greater than 10% levels in soil, it takes three to nine days to degrade. No MCPA was detected in forest soils at a depth of 3 to 15 cm 40 days after application. The half-life is five to six days in slightly acidic to slightly alkaline soils.

Bio-accumulation: Dicamba: Under conditions suitable to rapid metabolism, the half-life is less than 2 weeks. At an application rate of 6.7 kg/ha, no dicamba remained in the soil after one year. Available data indicate a low potential for 2,4-D to accumulate in fish.

Mobility: Dicamba does not bind to soil particles (Koc = 2 g/ml) and is highly soluble in water. It is therefore highly mobile in the soil and may contaminate groundwater. Its leaching potential increases with precipitation and the volume applied. MCPA leaches in most soils, but its mobility increases as organic matter decreases. 2,4-D : Although laboratory data demonstrate that 2,4-D is mobile in soils, its potential to contaminate groundwater is limited by its rapid rate of degradation and uptake by target plants. However, residues of 2,4-D have been detected in groundwater, mostly from point sources, such as mixing, loading and disposal.

German wgk: Not available

13. DISPOSAL CONSIDERATIONS

Disposal methods: Do not contaminate crops, grazing, rivers, oceans or dams with chemical or used container. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public waters. Do not discharge effluent containing this product to sewer systems. Dispose of in approved landfill or preferably in a pesticide incinerator.

Disposal of packaging: Rinse empty container three times with a volume of water equal to at least one tenth of that of the container. Add the rinsings to the spray tank before perforating and flattening the container. Dispose of in approved landfill or preferably in a pesticide incinerator.

14. TRANSPORT INFORMATION
UN no: 3000
Substance identity no: Dicamba: CAS RN 1918-00-9 (Dicamba-dimethylamine salt) 2,4-D: CAS RN 94-75-7 (2,4-D) MCPA: CAS RN 94-74-6 [(4-chloro-2-methylphenoxy) acetic acid]
ADR/RID class: 6.1
ADR/RID item no: 71 (a), (b), (c).
ADR/RID hazard identity no: 3000
IMDG - shipping name: Phenoxy pesticide, Liquid, Toxic.
IMDG - class: 6.1
IMDG - packaging group: III
IMDG - marine pollutant: 2,4-D is regarded as a marine pollutant.
IMDG - EMS no: 6.1 - 02
IMDG - MFAG table no: 510
IATA - shipping name: Phenoxy pesticide, Liquid, Toxic.
IATA - class: 6.1
IATA - subsidiary risk(s): -
ADNR - class: 6.1
UK - description: Phenoxy pesticide, Liquid, Toxic.
UK - emergency action class: 2X
UK - classification: 6.1
Tremcard no: TEC(R)-61G43b

15.	REGULATORY INFORMATION
EEC hazard classification: Toxic	
Risk phases:	Risk of serious damage to eyes Harmful in contact with skin Harmful if swallowed.
Safety phases:	Wash any contamination from skin and eyes immediately; Wash hands and exposed skin before eating, drinking or smoking, before meals and after work. Keep out of reach of children. Harmful to fish. Do not contaminate ponds, waterways or ditches with chemical or used container. Keep in original container, tightly closed, in a safe place, under lock and key. Wash out container thoroughly and dispose of safely.
National legislation: Act no. 85 of 1993 (Republic of South Africa)	

16. OTHER INFORMATION

NB. Read and understand all the information on the product label before using the product.

Dicamba is a benzoic acid herbicide. Dicamba controls annual and perennial broadleaf weeds in grasslands. It will kill broadleaf weeds before and after they sprout. MCPA is a systemic phenoxy herbicide used to control annual and perennial weeds in grasslands and turf. The herbicide works by concentrating in the actively growing regions of a plant (meristematic tissue) where it interferes with protein synthesis, cell division and ultimately the growth of the plant. 2,4-D, a chlorinated phenoxy compound, functions as a systemic herbicide and is used to control many types of broadleaf weeds. Mechanism of Pesticide Action: 2,4-D acid stimulates nucleic acid and protein synthesis affecting the activity of enzymes, respiration and cell division. Broadleaf plants exhibit malformed leaves, stems and roots.

Special precautions:
Keep livestock out of treated areas for at least 2 weeks and until foliage of any poisonous weeds have died and become unpalatable.

A hormone herbicide. Avoid pollution and spray drift. Aerial application of the product is not allowed.

All information and instructions provided in this Material Safety Data Sheet (MSDS) are based on the current state of scientific and technical knowledge at the date indicated on the present MSDS and are presented in good faith and believed to be correct. It is the responsibility of persons in receipt of this MSDS to ensure that the information herein is properly read and understood by all people who may use, handle, dispose or in any way come in contact with the product.

Compiled by: Marcel van Heyst
Status: complete (30/7/98)
Updated on 28/09/99 by Adele