

# DITHANE FUNGICIDE<sup>®</sup> (mancozeb)—for Ginseng

## 1. Formulation and Registrant

**Dithane DG Fungicide**—dispersible granular, PCP No. 20553

Active ingredient—mancozeb 75%, 20 kg bag.

**Dithane M-45**—wetable powder, PCP No. 8556

Active ingredient—mancozeb 80%, 20 kg bag.

Dow Agro Sciences Canada

201, 1144 - 29Ave. NE

Calgary Alberta T2E 7P1 (New Solutions Centre)

1-800-667-3852

## 2. How It Works

Dithane is a protective broad spectrum fungicide, registered for control of Alternaria leaf blight. It does not encourage the selection of resistant strains of fungi.

It is an organic sulphur compound which inhibits the production and function of amino acids and enzymes in fungi. It is effective when applied to plants before the fungus is present on the plant.

## 3. Use—When and How

The label says to “apply Dithane at 4.4 kg/ha (1.8 kg/ac), using 2000 litres/ha (800 L/acre) of water to give thorough coverage”. Coverage at the base of the stem is important to prevent infections at this site. See “Pesticide Application Options” on page 149 for further application information. The fungicide must dry on the plant before rainfall or irrigation occurs. Previous experience in arid climates has shown that Dithane may cause phytotoxicity to young ginseng plants especially if applied on a very hot day. Use 1/2 strength per ha to prevent plant damage with one and two-year old plants.

Keep the spray mixture agitated. Mancozeb is in a microgranular form that will disperse in water but is virtually insoluble in water. Mancozeb is stable in solutions which have a pH between 5 and 8. Buffer the solution if outside this range. Do not let the spray solution sit for more than 24 hours. The manufacturer recommends that you do not use any spreader-stickers with Dithane DG. It is believed compatible with most of the common pesticides used.

Dithane can be applied up to 30 days before harvest, and can be applied at 2 week intervals. There is a maximum of 6 applications per year. The maximum residue level is 0.1 ppm.

Use a boom sprayer with cone nozzles at pressures between 700 and 2000 kPa (100 – 300 psi). Pressures above 1000 kPa (150 psi) may damage ginseng leaves, especially if younger plants. Drop pendants will improve the coverage of lower leaves in the plant canopy.

## 4. Acute Toxicity

LD<sub>50</sub> oral = >5000 mg/kg (slight)

May cause irritation of nose, throat, eyes and skin.

## 5. Precautions

Wear protective clothing including long pants, long sleeve shirts, gloves, hats and boots during mixing, application and early reentry into treated fields.

Do not breathe dust or spray mist.

Keep out of reach of children.

**FOR POISONING SYMPTOMS, FIRST AID, AND DETAILED SAFETY PRECAUTIONS – READ LABEL!**

## 6. Environmental Considerations

This product is slightly toxic to birds and is not hazardous to honeybees. It is toxic to fish. Avoid contamination of water supplies. Do not apply where runoff into water bodies is likely to occur. Mancozeb is not likely to infiltrate to groundwater.

## 7. Storage

Store product in a well-ventilated, dry and warm place. Keep away from fire and sparks.

Do not let the temperature of the material go above 49° C. Do not allow it to become wet.

## 8. Container Disposal

Do not reuse pesticide containers. Dispose of containers according to the provincial government requirements.

## 9. Disclaimer

Seller’s guarantee shall be limited to the terms set out on the label and subject hereto The buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

# DYRENE<sup>®</sup> 50% WP (anilazine)—for Ginseng

## 1. Formulation and Registrant

**Dyrene**—wettable powder, PCP No. 6731

Active ingredient—anilazine 50%, 2 kg bag.

Bayer Crop Science Canada

100, 3131 - 114 Ave S.E. Calgary Alberta T2Z 3X2

1-888-283-6847

## 2. How it Works

It is a foliar protective fungicide, registered for Alternaria leaf blight.

## 3. Use—When and How

The label says to apply 4.4 kg/ha (1.8 kg/ac) with 2000 L water/ha (800 L/acre). See “Pesticide Application Options” on page 149 for further application information.

Apply in the early morning or on a cloudy day to prevent phytotoxicity. Dyrene can be applied up to 30 days before harvest. The maximum residue level is 0.1 ppm.

For a preventative program begin applications before diseases appear and repeat treatments as needed, usually at intervals of 10 to 14 days. During extended periods of cool, moist conditions applications every 7 days may be advisable. Complete and thorough coverage of foliage is necessary for satisfactory control. Do not spray in heavy dew or when rain is imminent. The fungicide must be present on the plant prior to rainfall to prevent infection from occurring. If the fungicide has dried onto the foliage it will not be washed off by rain.

Dyrene is sensitive to alkaline conditions. Try to keep the spray solution below a pH of 6.5. Do not allow the spray solution to stand for more than 20 hours before use.

Use a boom sprayer with cone nozzles at pressures between 700 and 2000 kPa (100 – 300 psi). Pressures above 1000 kPa (150 psi) may damage ginseng leaves, especially if younger plants. Drop pendants will improve the coverage of lower leaves in the plant canopy.

## 4. Acute Toxicity

LD<sub>50</sub> oral = >4000 mg/kg (slight).

Causes irreversible eye damage. May cause temporary allergic reactions.

## 5. Precautions

Avoid contact with skin and eyes. Causes irreversible eye damage (use protective eye wear).

Do not breathe dust or spray mist. Keep out of reach of children.

**FOR POISONING SYMPTOMS, FIRST AID, AND DETAILED SAFETY PRECAUTIONS—READ LABEL!**

## 6. Environmental Considerations

This product is toxic to fish. Do not apply where runoff into water bodies is likely to occur. Avoid contamination of water supplies. Dyrene has a low leaching potential.

## 7. Storage

Store product in a well ventilated, dry and warm place. Do not allow to become wet or overheated.

## 8. Container Disposal

Do not reuse pesticide containers. Dispose of containers according to the provincial government requirements.

*Note: There will be no new supplies of Dyrene in Canada. Growers may still use existing stocks.*

## 9. Disclaimer

Seller's guarantee shall be limited to the terms set out on the label and subject hereto The buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

# FORMALDEHYDE SOLUTION 37% WP (formalin)—for soil treatment and general disinfection

## 1. Formulation and Registrant

General Disinfection:

**Clean Crop Formalin**—solution, PCP No. 6998

Active ingredient—formaldehyde 37%, 4 L.

United Agri Products, 789 Donnybrook Dr. R.R. 2,  
Dorchester, Ontario N0L 1G5

1-800-561-5444 (Western Canada Customer Service)

## 2. How it Works

Formaldehyde is a general disinfectant that controls many soil bacteria, fungi and insects. It is toxic to plants.

## 3. Use—When and How

### **General Disinfection:**

Use at the rate of 100 ml in 10 L of water for disinfecting barns, etc. Clean the area to be treated thoroughly, then apply the solution with an old broom or a spray pump, the latter giving the best penetration into cracks and crevices.

## 4. Acute Toxicity

LD<sub>50</sub> oral = 550 mg/kg (slight), dermal = 270 mg/kg (moderate)

## 5. Precautions

Harmful if swallowed or inhaled. Causes irritation of eyes, nose and throat. Direct skin contact can cause irritation, dermatitis and discoloration. Frequent or prolonged exposure can cause hypersensitivity. Avoid exposure to fumes. Avoid contact with skin, eyes and clothing. Wash with soap and water after handling and before eating, drinking or smoking. Do not contaminate food or feed. Keep out of reach of children.

## **FOR POISONING SYMPTOMS, FIRST AID, AND DETAILED SAFETY PRECAUTIONS—READ LABEL!**

## 6. Environmental Considerations

This product is toxic to fish. Do not apply where runoff into water bodies is likely to occur. Avoid contamination of water supplies.

## 7. Storage

Always keep containers closed to prevent escape of the formaldehyde and consequent loss of strength. Store product in a well ventilated, dry and warm place. Store above 15 degrees Celcius to avoid precipitation of product.

## 8. Container Disposal

Do not reuse pesticide containers. Dispose of containers according to the provincial government requirements.

## 9. Disclaimer

Seller's guarantee shall be limited to the terms set out on the label and subject hereto The buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

# RIDOMIL Gold M1G (metalaxyl)—for Ginseng

## 1. Formulation and Registrant

**Ridomil Gold M1G**—granular (see 240EC description on next page), PCP No. 24037

Active ingredient—metalaxyl 2%, 11.3 kg bag

Syngenta Crop Protection Canada

140 Research Lane, Research Park, University of Guelph,  
Guelph, Ontario N1G 4Z3

1-800-665-9250 (Customer Resource Centre, West)

Emergency 1-800-327-8633 (Fastmed)

## 2. How It Works

Ridomil 2G is a systemic fungicide registered for the control of Phytophthora root rot. It also provides protection against Pythium. It moves into the soil and is readily absorbed through the roots of plants. Ridomil moves primarily upward in the plant with the transpiration stream. It has a fungistatic effect on the fungus, which means it inhibits the fungus growth rather than killing it. Fungistatic fungicides must be applied over the life of the plant to suppress disease development. It will prevent germination of the oospore, a resistant fungal structure that can survive in the soil for several years. It also prevents small mobile Phytophthora spores from penetrating roots. However, once an infection is established in the plant it only inhibits further development until the fungicide concentration drops below the level where it is effective. Metalaxyl inhibits the formation of sporangia, chlamydospores and oospores which reduces the opportunity for spread within the garden. Target organisms will quickly become insensitive to Ridomil, if not used according to the label.

## 3. Use—When and How

Ridomil 2G is applied as a broadcast application using 31.25 kg/ha (12.65 kg/acre). Make one application in the spring just prior to the time the plants begin growing. Make a second application 6 weeks later and a third application 6 weeks after the second one. Do not apply within 9 days of harvest. The maximum residue level is 0.1 ppm. Do not make more than three applications of any Ridomil product in a year.

Apply prior to rainfall to ensure it moves into the root zone, or use the irrigation system to water it in after application if this is feasible.

It is important to calibrate each individual granular applicator before use. Even after calibration, check application rate under actual operating conditions.

## 4. Acute Toxicity

LD<sub>50</sub> Oral = 6000 mg/kg (practically non-toxic)

## 5. Precautions

Avoid contact with skin and eyes. Avoid inhalation of dust. Do not eat, drink or smoke while loading applicator or during application. Keep out of reach of children.

**FOR POISONING SYMPTOMS, FIRST AID, AND DETAILED SAFETY PRECAUTIONS—READ LABEL!**

## 6. Environmental Considerations

Metalaxyl is non-toxic to honeybees. It is practically non-toxic to birds and fish but has slight toxicity to Daphnia, a small freshwater aquatic invertebrate. Do not use on soils with less than 2% organic matter, very coarse textured soil or where high water tables exist. Ridomil is very water soluble. There is concern that Ridomil could leach through sandy soils into the groundwater. Avoid contamination of water sources. Do not apply where runoff or spread into water bodies is likely to occur.

Metalaxyl has a half-life of 1 to 8 weeks in soil.

## 7. Storage

Store in a dry, well ventilated area. Store product in original container.

## 8. Container Disposal

Do not reuse pesticide containers. Dispose of containers according to the provincial government requirements.

## 9. Disclaimer

Seller's guarantee shall be limited to the terms set out on the label and subject hereto The buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

# RIDOMIL<sup>®</sup> 240EC (metalaxyl)—for Ginseng

## 1. Formulation and Registrant

**Ridomil 240EC**—PCP No. 17247

Active ingredient—metalaxyl 240g/L, 1L

Syngenta Crop Protection Canada

140 Research Lane, Research Park, University of Guelph,  
Guelph, Ontario N1G 4Z3

1-800-665-9250 (Customer Resource Centre, West)

Emergency 1-800-327-8633 (Fastmed)

## 2. How It Works

See Ridomil 2G description.

## 3. Use—When and How

For the control of Damping-off in the seedling year apply 1.3L/ha (0.5 L/acre) just prior to emergence of the seedlings. For the control of Phytophthora Root Rot in subsequent years apply 1.3 L/ha (0.5L/acre) as a soil broadcast application in the spring prior to the emergence of the ginseng. Apply in a minimum of 2500 L of water per hectare (1000 L/acre).

**Note:** For control of Root Rot during the growing season, **DO NOT USE RIDOMIL 240 EC**. Instead, make up to two applications of **RIDOMIL 2G** following the directions on the **RIDOMIL 2G** label. Do not apply any product containing metalaxyl within 9 days prior to harvesting ginseng. Do not make more than three applications per year of any product containing metalaxyl. The maximum residue level for metalaxyl is 0.1 ppm.

Fill spray tank 1/2 to 3/4 full with water. Metalaxyl is stable between pH 5 – 9. With agitation system engaged, add the required amount of **RIDOMIL 240 EC** and then continue filling the tank with water. Maintain sufficient agitation during the mixing and spraying operation. Sprayer equipment should be thoroughly flushed with clean water and drained before and after use of **RIDOMIL 240 EC**.

**Note:** Do not let tank contents stand for long periods of time without agitation. If spraying is interrupted, thoroughly re-agitate before application. **RIDOMIL 240EC SPRAY SOLUTION MUST NOT BE STORED OVERNIGHT.**

Do not apply the liquid formulation of Ridomil to emerged foliage for two reasons. Firstly, foliar applications of liquid Ridomil could promote the

development of resistant populations of Phytophthora. This has already happened in potato crops with another species of Phytophthora. Secondly, when the liquid formulation is applied to leaves it moves primarily out to the leaf tip and only about 20% moves down inside the plant into the root area. This is not enough to provide control of root rot. Granular applications go to the root where the fungus is active, as well as moving into the leaves.

## 4. Acute Toxicity

LD<sub>50</sub> Oral = 6000 mg/kg (practically non-toxic)

## 5. Precautions

Avoid contact with skin and eyes. Avoid inhalation of dust. Do not eat, drink or smoke while loading applicator or during application. Keep out of reach of children.

**FOR POISONING SYMPTOMS, FIRST AID, AND DETAILED SAFETY PRECAUTIONS – READ LABEL!**

## 6. Environmental Considerations

Metalaxyl is non-toxic to honeybees. It is practically non-toxic to birds and fish but has slight toxicity to Daphnia, a small freshwater aquatic invertebrate. Do not use on soils with less than 2% organic matter, very coarse textured soil or where high water tables exist. Ridomil is very water soluble. There is concern that Ridomil could leach through sandy soils into the groundwater. Avoid contamination of water sources. Do not apply where runoff or spread into water bodies is likely to occur.

Metalaxyl has a half-life of 1 to 8 weeks in soil.

## 7. Storage

Store in a dry, well ventilated area. Store product in original container.

## 8. Container Disposal

Do not reuse pesticide containers. Dispose of containers according to the provincial government requirements.

## 9. Disclaimer

Seller's guarantee shall be limited to the terms set out on the label and subject hereto The buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

# ROVRAL<sup>®</sup> (iprodione)—for Ginseng

## 1. Formulation and Registrant

**Rovral**—wetable powder, PCP No. 15213

Active ingredient—iprodione 500 g/kg, 1 kg bag.

Bayer Crop Science Canada

100, 3131 - 114 Ave S.E. Calgary Alberta T2Z 3X2

1-888-283-6847

## 2. How It Works

Rovral is a protective and curative fungicide. It will arrest disease development in very young infections. Registered for control of *Alternaria* leaf blight, it is also effective against *Botrytis* blight. Iprodione inhibits the germination of spores and the growth of mycelium. It is effective against a wide spectrum of fungi.

## 3. Use—When and How

Apply when conditions for disease development are favourable. Apply with ground equipment. The label says to use 1.1 kg/ha (0.45 kg/acre) in at least 2000 L/ha (800 L/acre). Put half the water volume in the tank, add the Rovral and then add the remainder of the water. Agitate thoroughly. See “Pesticide Application Options” on page 149 for further application information.

The spray mixture should be used on the day it is prepared, especially if the pH of the solution is alkaline (greater than a pH of 7). Good spray coverage is essential. Do not spray in heavy dew or when rain is imminent. The fungicide should be present on the plant prior to rainfall to prevent infection from occurring. If the fungicide has dried onto the foliage it will not be washed off by rain. Do not allow spray to drift onto oats. Do not mix with other pesticides, adjuvants or fertilizers except where stated.

There is a maximum of 3 applications per year. Space applications at least one month apart. Do not apply within 30 days of harvest. The maximum residue level is 0.1 ppm in Canada. Alternate with other fungicides to avoid the development of insensitive fungi. Resistant strains of *Alternaria* and *Botrytis* exist.

Use a boom sprayer with cone nozzles at pressures between 700 and 2000 kPa (100 – 300 psi). Pressures above 1000 kPa (150 psi) may damage ginseng leaves, especially if younger plants. Drop pendants will improve the coverage of lower leaves in the plant canopy.

## 4. Acute Toxicity

LD<sub>50</sub> oral = >4400 mg/kg (slight)

It is a mild eye irritant. Skin irritation or dermatitis may occur upon frequent or prolonged contact. Repeated or prolonged contact may cause sensitization in some individuals.

## 5. Precautions

Use protective eye wear. Avoid contact with skin and eyes. Wear protective clothing. Avoid inhaling mist. Keep out of reach of children.

**FOR POISONING SYMPTOMS, FIRST AID, AND DETAILED SAFETY PRECAUTIONS—READ LABEL!**

## 6. Environmental Considerations

Iprodione is only slightly toxic to waterfowl and is not toxic to bees. It is moderately toxic to fish. Iprodione is not very water soluble and is considered to have a low potential for leaching to groundwater. Avoid contamination of water sources. Do not apply where runoff into water bodies is likely to occur.

## 7. Storage

Store above 0°C. Avoid excessive heat.

## 8. Container Disposal

Do not reuse pesticide containers. Dispose of containers according to the provincial government requirements.

## 9. Disclaimer

Seller's guarantee shall be limited to the terms set out on the label and subject hereto. The buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

## QUADRIS<sup>®</sup> (azoxystrobin)—for Ginseng

**NOTE:** *The emergency use label is valid until Apr. 30, 2003. After April 30, check the registration status of this product before using.*

### 1. Formulation and Registrant

**Quadris**—Flowable fungicide PCP #26153

Active Ingredient—azoxystrobin 250 g/l

SSyngenta Crop Protection Canada

140 Research Lane, Research Park, University of Guelph,  
Guelph, Ontario N1G 4Z3

1-800-665-9250 (Customer Resource Centre, West)

Emergency 1-800-327-8633 (Fastmed)

### 2. How It Works

Quadris is a broad spectrum preventative and curative, systemic fungicide used for the control of Rhizoctonia diseases on ginseng.

### 3. Use—When and How

In the spring of 2003, under the current label, Quadris can only be used on gardens seeded in the fall of 2002. It cannot be sprayed on 2,3 and 4-year old gardens. It cannot be used after April 30, 2003.

For best control of rhizoctonia (*Rhizoctonia solani*) on ginseng, apply Quadris Flowable Fungicide in 4000 L of water per hectare. Application can be made over the straw mulch.

**Newly seeded gardens:** Apply 1.12 L per hectare post seeding after September 30th and a second application in the spring at the rate of 1.12 L per hectare pre-emergence before May 1st.

**Seedling gardens (gardens seeded fall 2001):** Make only one application of 1.12 L per hectare in the fall after September 30th when the plants have senesced (died back).

**Ground application:** Apply using nozzle tips and in sufficient water volume for thorough coverage (i.e. At least 4000 litres per hectare). Do not overspray non-crop terrestrial habitats. A buffer zone of 15

metres is required between the down wind edge of the boom and sensitive aquatic habitats such as sloughs, ponds, prairie potholes, lakes, rivers, streams and wetlands. Do not contaminate these habitats when cleaning and rinsing spray equipment and containers.

**NOTE:** *Do not spray less than 24 months before harvest.*

QUADRIS Flowable Fungicide treatments should be integrated into an overall disease management strategy that includes selection of varieties with disease tolerance, plant residue management, crop rotation, and proper timing and placement of fertilizer and irrigation.

**CAUTION:** QUADRIS Flowable Fungicide has been shown to be extremely phytotoxic to certain apple and crab-apple varieties. QUADRIS Flowable Fungicide should not be applied where there is the possibility of spray drift reaching apple trees. **DO NOT** use sprayers used to apply QUADRIS Flowable Fungicide to spray apples or crab-apples.

Do not apply during periods of dead calm, when winds are gusty or when wind speed is greater than 15 km/hr at 2 metres above ground at the site of application.

**General Mixing Instructions:** Partially fill the spray tank with clean water and begin agitation. Add the specified amount of QUADRIS Flowable Fungicide to the tank. Finish filling the tank to the desired volume to obtain the required spray concentration, maintain agitation. Maintain agitation throughout the spraying operation. If the spray mixture is left to stand for a prolonged period (i.e. overnight), vigorous agitation will be required to re-suspend the fungicide.

### 4. Acute Toxicity

LD 50 Oral >5000 mg/kg (practically non-toxic)

### 5. Precautions

KEEP OUT OF REACH OF CHILDREN

May irritate eyes. Avoid contact with eyes, skin and clothing. Avoid breathing dust or spray mist. Wash with soap and water after handling and before eating, drinking or smoking. Wash contaminated clothing separately from household laundry before re-use. Do not wear contaminated shoes.

Wear long-sleeve shirt and long pants when mixing, loading and applying and during clean-up and repair activities. Wear chemical resistant gloves during mixing and loading.

Do not re-enter treated fields until residues have dried.

This product demonstrates the properties and characteristics associated with compounds detected in ground water. The use of this product in areas where soils are permeable, particularly where the water table is shallow, may result in ground water contamination.

DO NOT use the leaves for feed.

## 6. Environmental Considerations

DO NOT apply QUADRIS Flowable Fungicide through irrigation equipment.

DO NOT apply QUADRIS Flowable Fungicide by air.

## 7. Storage

Store in a dry, well-ventilated area. Store product in original container.

## 8. Container Disposal

Do not reuse pesticide containers. Make the empty container unsuitable for further use. Dispose of containers according to provincial government requirements.

## 9. Disclaimer

The DIRECTIONS FOR USE for this product for the use(s) described above were developed by persons other than Syngenta Crop Protection Canada Inc. and accepted for registration by Health Canada under the Emergency Use Registration program. Syngenta Crop Protection Canada Inc. itself makes no representation or warranty with respect to performance (efficacy) and/or crop tolerance (phy-

totoxicity) claims for this product when used on the crop(s) listed on this Supplementary Label.

According, the Buyer and User assume all liability arising, and agree to hold Syngenta Crop Protection Canada Inc. harmless from any claims based on efficacy and/or phytotoxicity in connection with the use(s) described on this Supplementary Label.

## POUNCE<sup>®</sup> (Permethrin) – for Ginseng

### 1. Formulation and Registrant

Permethrin 384 g/l liquid insecticide

PCP # 16688 FMC Corporation  
1735 Market Street, Philadelphia PA 19103  
Phone: 1-800-331-3148

Emergency Phone: 1-800-424-9300 for health and environmental reasons only.

### 2. How It Works

Permethrin is a stomach and contact insecticide with no systemic or fumigant effect. Therefore it is very important to obtain excellent spray coverage. Permethrin residues can remain active for 6 weeks in the shade, one week in direct sunlight. Plant growth will reduce residual potency.

### 3. Use—When and How

Pounce is a liquid insecticide used for the control of: army, black, pale western, red-backed and white and variegated cutworms and four-lined plant bugs on ginseng.

For cutworms, ground application only, apply in sufficient water to give thorough coverage of the plants.

Application rates for from 180 to 390 mL/ha.

Use higher rates if infestation is heavy.

If cutworms are near full maturity (2.5-4 cm) use 295-390 mL/ha.

If conditions are dry, use 195 to 390 mL/ha.

A maximum of two applications per year is allowed. Apply only when scouting indicates cutworms are present.

Applications should be made under warm, moist conditions in the evening or at night when cutworm activity is highest.

For four-lined plant bugs, ground application only, at rates of 180 to 260 mL/ha. Apply a maximum of two applications per year.

Wash out product container thoroughly by triple rinsing, emptying rinsate into spray tank.

May be applied up to 40 days before harvest. A maximum of two applications is permitted per year against all pests.

### 4. Acute Toxicity

Oral LD 50 (rat) = >4000 mg/kg

Is a synthetic pyrethroid insecticide with low mammalian toxicity.

### 5. Precautions

**When handling the concentrate:** Wear a long sleeve shirt and long pants, chemically resistant gloves and eye protection. Wash splashes from skin and eyes immediately with plenty of water. If any is spilled on clothing remove immediately and wash skin thoroughly.

**When spraying:** Wear a long sleeve shirt and long pants, chemically resistant gloves and eye protection. Avoid working in spray mist. Avoid all drift or contact with other vegetation. Do not eat, drink or smoke while applying any pesticide. Wash hands and exposed skin with soap and water thoroughly before eating, drinking, or smoking. Avoid spraying food, drink and animal feeds.

**After spraying:** Wash hands and shower thoroughly.

**Re-entry** is permissible as soon as the spray has dried.

### 6. Environmental Considerations

This product is very toxic to fish and bees and is toxic to beneficial insects.

Liquid spills on floor or other impervious surfaces should be contained or diked, and should be absorbed with attapulgite, bentonite or other absorbent clays (kitty litter, etc). Collect contaminated absorbent, place in plastic lined metal drum and dispose in accordance with instructions provided under DISPOSAL. Thoroughly scrub floor or other impervious surfaces with a strong industrial type detergent solution and rinse with water.

Liquid spills that soak into the ground should be dug-up, placed in plastic lined metal drums and disposed of in accordance with the instructions under DISPOSAL.

### 7. Storage

Do not store near food, feed, heat or open flame. Do not freeze product or store above 40°C.

### 8. Container Disposal

Do not re-use containers. Make the empty container unsuitable for further use. Dispose of container in accordance with provincial government requirements.

### 9. Notice to Buyer

Sellers guarantee shall be limited to the terms set out on the label and subject thereto, the buyer assumes the risk to persons or property arising from the use or handling of this product and accepts the product on that condition.

## ROUNDUP TRANSORB<sup>®</sup>

### 1. Formulation and Registrant

Roundup Transorb—liquid. PCP #25344

Active ingredient Glyphosate 360 gms/L.

Monsanto Canada Inc., Box 667, Mississauga, Ontario L5M 2C2 or 67 Scurfield Blvd., Winnipeg, Manitoba R3Y 1G4 Phone 204 895-1000 or 1-800-667-4944

Emergency Phone No. 1-800-332-3111

### 2. How It Works

Roundup Transorb is a non-selective herbicide used for weed control in ginseng gardens as a pre-emergence application. Water soluble.

### 3. Use—How and When

**New Gardens(British Columbia Only):** Apply this product in the fall after seeding but before freeze-up in new gardens only to control volunteer cereals. Apply when weeds are the growth stages listed on the product label. Use a single application of 2.5 L/ha in 50 to 100 L water/ha. **DO NOT USE A FALL APPLICATION IN ESTABLISHED/EXISTING GARDENS.**

**Existing/Established Gardens:** Apply this product in the spring before the crop has emerged above the soil. Apply when weeds are at the growth stages described in the product label. A maximum of 2.5 L/ha applications in 50 – 100 L water/ha may be made in a season. **DO NOT USE A FALL APPLICATION IN ESTABLISHED/EXISTING GARDENS.**

### 4. Acute Toxicity

Oral LD<sub>50</sub> = 5600 mg/kg (practically non-toxic).

### 5. Precautions

When handling the concentrate: Wear a long sleeve shirt and long pants, chemically resistant gloves and eye protection. Wash splashes from skin and eyes immediately with plenty of water.

**When spraying:** Wear a long sleeve shirt and long pants, chemically resistant gloves and eye protection. Avoid working in spray mist. Avoid all drift or contact with other vegetation.

When using do not eat, drink or smoke.

Wash hands and exposed skin with soap and water thoroughly before eating, drinking, or smoking.

Wash out container thoroughly, empty washings into spray tank and dispose of safely.

**After Spraying:** Wash hands and shower thoroughly. Keep away from food, drink and animal stuffs.

### 6. Environmental Considerations

Avoid contamination of seed, feed and foodstuffs. Liquid spills on floor or other impervious surfaces should be contained or diked, and should be absorbed with attapulgite, bentonite or other absorbent clays (kitty litter, etc). Collect contaminated absorbent, place in plastic lined metal drum and dispose of in accordance with instructions provided under DISPOSAL. Thoroughly scrub floor or other impervious surfaces with a strong industrial type detergent solution and rinse with water.

Liquid spills that soak into the ground should be dug-up, placed in plastic lined metal drums and disposed of in accordance with the instructions under DISPOSAL.

Leaking containers should be separated from non-leakers and either the container or its contents transferred to a plastic lined metal drum or other non-leaking container and disposed of by use according to label directions or in accordance with instructions provided under DISPOSAL. Any recovered spilled liquid should be similarly collected and disposed of.

### 7. Storage

Do not expose to temperatures above 40°C. Not affected by freezing. Store in original container, tightly closed, in a safe place.

### 8. Container Disposal

Do not re-use pesticide containers. Make the empty container unsuitable for further use. Dispose of container in accordance with provincial government requirements.

### 9. Disclaimer

The DIRECTIONS FOR USE for this product for the use(s) described on the Supplementary Label were developed by persons other than Monsanto Canada and accepted for registration by Health Canada under the User Requested Minor Use Label Expansion program. Monsanto Canada itself makes no representation or warranty with respect to performance (efficacy) and/or crop tolerance (phytotoxicity) claims for this product when used on the crop(s) listed on this Supplementary Label.

Accordingly, the Buyer and User assume all liability arising, and agree to hold Monsanto harmless from any claims based on efficacy and/or phytotoxicity in connection with the use(s) described on this Supplementary Label.

## VENTURE L<sup>®</sup> (fluazifop-P-butyl)-for Ginseng

### 1. Formulation and Registrant

VENTURE<sup>®</sup> L-Liquid herbicide PCP#24192

Active ingredient fluazifop-P-butyl, 125 g/l

Syngenta Crop Protection Canada

140 Research Lane, Research Park, University of Guelph,  
Guelph, Ontario N1G 4Z3

1-800-665-9250 (Customer Resource Centre, West)

Emergency 1-800-327-8633 (Fastmed)

### 2. How it Works

Venture is a systemic post-emergence herbicide for control of grasses in broadleaf crops.

**NOTE:** *Experimental feeding studies in rats have demonstrated that the active ingredient in this product can produce birth defects and other adverse effects in the developing fetus of rats. Women capable of bearing children should be particularly careful when handling this product. Occupational exposure to this product will be reduced by strict adherence to the handling precautions and use directions provided.*

### 3. Use—When and How

**Directions for Use:** Always refer to the respective product label for further information on weeds controlled, application directions, and use precautions.

**Ginseng**—refer to full product label for complete listing of weeds controlled and appropriate rates. Do not exceed 2 L/ha at any application timing. Maximum of three applications per year. Apply early May; late June; mid August. Ground application only. Do not apply in the year of harvest. Apply @ 2-5 leaf stage, do not apply in very cold temperature.

### 4. Acute Toxicity

LD<sub>50</sub>Oral = 3328 mg/kg (practically non-toxic)

### 5. Precautions

When handling the concentrate: Wear a long sleeve shirt and long pants, chemically resistant gloves and eye protection. Wash splashes from skin and eyes immedi-

ately with plenty of water. If any is spilled on clothing remove immediately and wash skin thoroughly.

**When Spraying:** Wear a long shirt and long pants, chemically resistant gloves and eye protection. Avoid working in spray mist. Avoid all drift or contact with other vegetation. Do not eat, drink or smoke while applying any pesticide.

Wash hands and exposed skin with soap and water thoroughly before eating, drinking, or smoking. Avoid spraying food, drink and animal feeds.

**After spraying:** Wash hands and shower thoroughly.

**Re-entry** is permissible as soon as the spray has dried.

Avoid drift onto other crops and non-target areas. Corn, cereals and turf are highly susceptible to VENTURE L.

Do not apply by aircraft.

### 6. Environmental Considerations

Liquid spills on floor or other impervious surfaces should be contained or diked, and should be absorbed with attapulgate, bentonite or other absorbent clays (kitty litter, etc). Collect contaminated absorbent, place in plastic lined metal drum and dispose in accordance with instructions provided under DISPOSAL. Thoroughly scrub floor or other impervious surfaces with a strong industrial type detergent solution and rinse with water.

Liquid spills that soak into the ground should be dug-up, placed in plastic lined metal drums and disposed of in accordance with the instructions under DISPOSAL.

### 7. Storage

Do not store near food, feed, heat or open flame. Do not freeze product or store above 40°C.

Do not re-use pesticide containers. Make the empty containers unsuitable for further use.

### 8. Container Disposal

Do not re-use pesticide containers. Make the empty container unsuitable for further use. Dispose of container in accordance with provincial government requirements.

### 9. Notice to Buyer

The DIRECTIONS FOR USE for this product for the use(s) described on the Supplementary Label were developed by persons other than Syngenta Crop Protection Canada Inc., and accepted for registration by Health Canada under the User Requested Minor Use Label Expansion program. Syngenta Crop Protection Canada Inc., itself makes no representation or warranty with respect to performance (efficacy) and/or crop tolerance (phytotoxicity) claims for this product when used on the crop(s) listed on this Supplementary Label.

Accordingly, the Buyer and User assume all liability arising, and agree to hold Syngenta Crop Protection Canada Inc., harmless from any claims based on efficacy and/or phytotoxicity in connection with the use(s) described on this Supplementary Label.

# TOUCHDOWN<sup>®</sup> 480 (glyphosate)—for Ginseng

## 1. Formulation and Registrant

Touchdown 480 Herbicide liquid.

10L, 110L and bulk active ingredient glyphosate 330 g/L acid equivalent  
(present as 480 gm/L trimethylsulfonium). PCP #23971

Syngenta Crop Protection Canada

140 Research Lane, Research Park, University of Guelph,  
Guelph, Ontario N1G 4Z3

1-800-665-9250 (Customer Resource Centre, West)

Emergency 1-800-327-8633 (Fastmed)

## 2. How It Works

Touchdown is a non-selective herbicide used for weed control in ginseng gardens as a pre-emergence (ginseng) application.

Water soluble.

## 3. Use—When and How

**New Gardens (British Columbia Only):** Apply Touchdown 480 in the fall after seeding but before freeze-up in new gardens only, to control volunteer grain. Apply when weeds are at the growth stage described on the label. Use one application at 2.5 L/ha in 50 to 100 L of water per ha. **DO NOT USE A FALL APPLICATION IN EXISTING/ESTABLISHED GARDENS.**

**Existing/Established Gardens:** Apply Touchdown 480 in the spring before the crop has emerged above the soil. Apply when weeds are at the growth stage described on the label. Use up to two applications at 2.5 L/ha in 50 – 100 L of water per ha. **DO NOT USE A FALL APPLICATION IN EXISTING/ESTABLISHED GARDENS.**

## 4. Acute Toxicity

Oral LD<sub>50</sub> (rat) = 1298-1760 mg/kg

## 5. Precautions

**When handling the concentrate:** Wear a long sleeve shirt and long pants, chemically resistant gloves and eye protection. Wash splashes from skin and eyes immediately with plenty of water.

**When spraying:** Wear a long sleeve shirt and long pants, chemically resistant gloves and eye protection. Avoid working in spray mist. Avoid all drift or contact with other vegetation.

**After spraying:** Wash hands and shower thoroughly. When using do not eat, drink or smoke. Wash hands and exposed skin with soap and water thoroughly before eating, drinking, or smoking. Wash out container thoroughly, empty washings into spray tank and dispose of safely.

Keep away from food, drink and animal stuffs.

## 6. Environmental Considerations

Avoid contamination of seed, feed and foodstuffs. Liquid spills on floor or other impervious surfaces should be contained or diked, and should be absorbed with attapulgate, bentonite or other absorbent clays (kitty litter, etc.) Collect contaminated absorbent, place in plastic lined metal drum and dispose of in accordance with instructions provided under DISPOSAL. Thoroughly scrub floor or other impervious surfaces with a strong industrial type detergent solution and rinse with water.

Liquid spills that soak into the ground should be dug-up, placed in plastic lined metal drums and disposed of in accordance with the instructions under DISPOSAL. Leaking containers should be separated from non-leakers and either the container or its contents transferred to a plastic lined metal drum or other non-leaking container and disposed of by use according to label directions or in accordance with instructions provided under DISPOSAL. Any recovered spilled liquid should be similarly collected and disposed of.

## 7. Storage

Do not expose to temperatures above 40°C. Not affected by freezing.

Store in original container, tightly closed, in a safe place.

## 8. Container Disposal

Do not re-use pesticide containers. Make the empty container unsuitable for further use. Dispose of container in accordance with provincial government requirements.

## 8. Disclaimer

The DIRECTIONS FOR USE for this product for the use(s) described below were developed by persons other than Syngenta Crop Protection Canada Inc., and accepted for registration by Health Canada under the User Requested Minor Use Label Expansion program. Syngenta Crop Protection Canada Inc., itself makes no representation or warranty with respect to performance (efficacy) and/or crop tolerance (phytotoxicity) claims for this product when used on the crop(s) listed on this Supplementary Label.

Accordingly, the Buyer and User assume all liability arising, and agree to hold Syngenta Crop Protection Canada Inc., harmless from any claims based on efficacy and/or phytotox-

icity in connection with the use(s) described on this Supplementary Label.

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*Dr. James Hill*      *Dr. Allen Bain*  
604 224-4331      604 224-0540  
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CHEMICAL/MICRO-BIO

### BCT

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### BUCKMAN LABORATORIES OF CANADA

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### CANTEST LTD.

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MICRO-BIO

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17240 26A Avenue  
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250 765-3399      250-765-3556  
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### IG MICROMED

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190 – 12860 Clarke Pl.  
Richmond, British Columbia V6V 2H1  
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MICRO-BIO

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12 3871 North Fraser Way  
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MICRO-BIO

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White Rock, British Columbia V4B 2M8  
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### NATURAL FACTOR'S LABORATORY\*

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SOILS/WATER/BIO

### OKANAGAN GINSENG LABORATORY LTD.

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### PACIFIC SOIL ANALYSIS INC.

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CHEMICAL/MICRO-BIO

### WESTGRO SALES INC.

260 D Champion Street  
Kelowna, British Columbia V1Y 1L8  
*Leo Sunder*      *Steve Marino*

\* Labs that have qualified to test for ginsenosides in recent pgm.

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### **Williams Lake**

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800-663-7867

## CHEMICAL COMPANY ADDRESSES AND PHONE NUMBERS

### **BASF Canada Inc**

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Phone 1-877-371-BASF (2273).  
Emergency 1-800-454-2673.

### **Bayer CropScience Canada**

Suite 100, 3131 – 114 Avenue S.E.  
Calgary, Alberta T2Z 3X2  
Toll-Free Helpdesk: 1-888-283-6847  
Emergency phone number: DART: 1-800-334-7577

### **Dow AgroSciences Canada Inc.**

Suite 201, 1144 - 29 Avenue N.E.  
Calgary, Alberta T2E 7P1  
Toll-Free: 1-800-667-3852

### **DuPont Canada Agricultural Products**

P.O. Box 2300 Streetsville  
Mississauga, Ontario L5M 2J4  
Toll-Free Hotline: 1-800-667-3925

### **FMC Corp., Agricultural Chemical Div.**

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### **Gustafson Partnership**

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### **United Agri-Products**

789 Donnybrook Drive, RR 2  
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Toll-Free: 1-800-265-4624

### **Valent Biosciences**

19 Wildan Dr. Box 19  
Freelton, Ontario L0R 1K0  
Phone: 905-659-0886



Measured delivery rate _____	L/ha L/acre
Area sprayed by a full tank _____	ha acre
Tractor gear _____	
Throttle _____	rpm
Forward speed (if Timed Output) _____	km/h mph
Nozzles _____	
Regulator Pressure _____	kPa(psi)
Date _____	

# Calibration Worksheet – Boom Sprayer

Follow this step-by-step procedure to calibrate a sprayer. All liquid volumes are in litres (L), but you can use *either* metric or *imperial* units for distance and area (don't mix them). Circle the units used such as 500 **(L/ha)** L/acre

After you've finished calibrating your equipment, **write key data in the box at left for future reference.**

Use the Pesticide Use Calculation worksheet to find the area sprayed by a full tank, and to calculate how much of each pesticide you'll need to buy and add to each tank.

## 1. SET-UP

### Inspection Before Sprayer Start-up

- Tank size is \_\_\_\_\_ L
- Calibration strip or dipstick for tank?
- Tire size & pressures okay? (Record on p 211)
- Hoses in good condition?

#### Filler opening screen

- in place? clean? good repair?
- mesh size correct? \_\_\_\_\_

#### Suction screen

- in place? clean? good repair?
- mesh size correct? \_\_\_\_\_

#### Nozzle screens (check each one)

- in place? clean? good repair?
- mesh size correct? \_\_\_\_\_



#### Nozzles:

- nozzle type okay?
- all same size/ID#? (record in box above)
- correct nozzle spacing of \_\_\_\_\_ cm(*in*)
- nozzles spaced evenly?
- clean? not worn?
- aligned?
- are there nozzle check valves?

#### Boom height

- above target? \_\_\_\_\_ cm(*in*)
- is boom level?

#### Surge tank (piston & diaphragm pumps only)

- working properly?
- air pressure correct at \_\_\_\_\_ kPa(psi)



### Inspection with Sprayer

#### Running

Fill the tank more than half full with clean water.

- start sprayer pump & run tractor throttle at \_\_\_\_\_ rpm.

Note pump's maximum rpm is \_\_\_\_\_.

- open boom valve to fill lines and begin spraying
- clean nozzles producing distorted patterns and retest
- throw out damaged nozzles and replace them

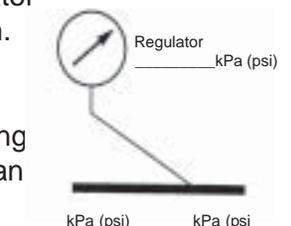
#### Check and fix any problems

- leaks?
- valves working?
- agitation okay?
- bypass flow okay?
- adjust pressure regulator to get right spray pressure at the nozzles

#### Measure pressure at regulator and nozzles along boom.

Draw extensions of the boom as necessary.

- pressure gauge working
- Pressure drop less than 10%?



## Measuring Nozzle Output

Draw nozzle locations on the diagram below and number them to identify which ones may need to be cleaned or replaced after testing. As the sprayer runs, collect and record the output for a set time eg. 1 minute, 30 sec or 15 sec. Measure in litres.

Horizontal boom  
(include drop pendants)



Nozzle pressure is \_\_\_\_\_ kPa (psi)

- In the box below, divide Total Output in L by the number of nozzles to find the average output per nozzle for collection time.

Total Output Collected	÷	# of nozzles	=	Average Output Collected
L	÷	noz.	=	L

- For uniformity, find the maximum and minimum acceptable output (5% more or less than average.) Replace if above maximum output.

Minimum Output	=	0.95	x	_____ Average Output	=	_____ L
Maximum Output	=	1.05	x	_____ Average Output	=	_____ L

- Replace all nozzles if average output is 15% more than a new nozzle's output (from manufacturer's chart or discharge test).

Average Output per Collection	÷	Collection Time	x	Conversion	=	Average Output
L	÷	sec	x	60 sec/min	=	L/min

New Nozzle Output	x	Constant	=	Maximum Average Output
L/min	x	1.15	=	L/min

**Swath Width** Do only ONE of these. You'll use the swath width on the next page.

**Broadcast swath:** multiply number of nozzles by nozzle spacing; convert to metres or feet (for spraying herbicides, especially before ginseng is planted).

# nozzles	x	spacing	÷	conversion	=	swath width
noz.	x	cm	÷	100 cm/m	=	m
noz.	x	in	÷	12 in/ft	=	ft

**Ginseng bed swath:** multiply number of beds by width of each bed.

(Note: beds are stated in metres or feet, so no conversion is needed).

# beds	x	bed width	=	swath width
beds	x	m	=	m
beds	x	ft	=	ft

Nozzle Output		Nozzle Output	
Litres per ___ sec		Litres per ___ sec	
1.	_____ L	21.	_____ L
2.	_____ L	22.	_____ L
3.	_____ L	23.	_____ L
4.	_____ L	24.	_____ L
5.	_____ L	25.	_____ L
6.	_____ L	26.	_____ L
7.	_____ L	27.	_____ L
8.	_____ L	28.	_____ L
9.	_____ L	29.	_____ L
10.	_____ L	30.	_____ L
11.	_____ L	31.	_____ L
12.	_____ L	32.	_____ L
13.	_____ L	33.	_____ L
14.	_____ L	34.	_____ L
15.	_____ L	35.	_____ L
16.	_____ L	36.	_____ L
17.	_____ L	37.	_____ L
18.	_____ L	38.	_____ L
19.	_____ L	39.	_____ L
20.	_____ L	40.	_____ L
		<b>Total</b>	_____ L

## 2. Measuring Delivery Rate

You can use either of these methods to determine the actual delivery rate of the sprayer.

### Test Area method

1. Mark out a test strip at least 60 m or 200 ft long. Your strip was \_\_\_\_\_ m(ft) long.  
**Note:** A one acre test strip is = 43,560 ft<sup>2</sup> ÷ \_\_\_\_\_ ft (swath width) = \_\_\_\_\_ ft. long.
2. Fill the tank about half full with water and start sprayer nozzles and agitation. Then set the pressure to what you want. Use the same throttle RPM you'll use in the field. Pressure \_\_\_\_\_ kPa(psi)
3. Choose a tractor gear to get desired forward speed. Gear \_\_\_\_ Throttle \_\_\_\_ rpm (as in step 2)
4. Record the volume of water in the tank before the test: \_\_\_\_\_ L. Mark where the sprayer is parked so you can return it to the same position to measure water sprayed (level ground is best).
5. Drive towards the first stake at the correct speed, and open the boom valve as you pass it. Check the sprayer pressure. Close the boom valve as you pass the second stake.
6. Repeat until at least 10% of a full tank is sprayed. Record the number of runs ( \_\_\_\_\_ runs).
7. Return to the water filling site and park in the same location as in Step 4. Measure the amount of water remaining: \_\_\_\_\_ L. Number of litres discharged during the test was \_\_\_\_\_ L.
8. Calculate the test area. Multiply the strip length by your swath width by the number of runs.

strip length	x	swath width	x	# runs	=	test area
m	x	m	x	runs	=	m <sup>2</sup>
ft	x	ft	x	runs	=	ft <sup>2</sup>

9. Calculate the Delivery Rate. Divide water sprayed (L) by test area (m<sup>2</sup> or ft<sup>2</sup>).

water sprayed	÷	test area	x	conversion	=	delivery rate
L	÷	m <sup>2</sup>	x	10,000 m <sup>2</sup> /ha	=	L/ha
L	÷	ft <sup>2</sup>	x	43,560 ft <sup>2</sup> /acre	=	L/acre

(L/ha=2.5 times L/acre      L/acre - 0.4 times L/ha)

### Timed Output method

1. Measure the forward speed of your tractor and sprayer with a half tank of water in field conditions. (Tractor speedometers need to be checked for accuracy, see page 211.)
2. Measure total nozzle output by spraying for a set time (such as 10 min) and divide volume (L) by time to find total output (L/min) OR use total nozzle output (L/min) from page 206.
3. Divide total output by forward speed and swath width and multiply by a constant to get the Delivery Rate.

total nozzle output	÷	forward speed	÷	swath width	x	constant	=	delivery rate
L/min	÷	km/h	÷	m	x	600	=	L/ha
L/min	÷	mph	÷	ft	x	495	=	L/acre

(L/ha=2.5 times L/acre      L/acre - 0.4 times L/ha)

Tank volume at start \_\_\_\_\_ L. Tank Volume at finish \_\_\_\_\_ L. Discharge time \_\_\_\_\_ min.

Discharge volume (start-finish) = \_\_\_\_\_ L

Total nozzle output = (Discharged Volume ÷ Time) = \_\_\_\_\_ L ÷ \_\_\_\_\_ min. = \_\_\_\_\_ L/min.

### 3. Adjusting Delivery Rate

If the Delivery Rate of your sprayer is different than the rate listed on the pesticide label or recommended in the production guide, it can be adjusted in three ways:

- Nozzle size** should be changed if you wish to make large changes in delivery rate. Check with your nozzle supplier or agricultural advisor. Obtain a catalogue listing nozzles and nozzle outputs.

The following formula can also be used to find nozzle size.

delivery rate	x	forward speed	x	nozzle spacing	÷	constant	=	nozzle output
L/ha	x	km/h	x	cm	÷	60,000	=	L/min
L/acre	x	mph	x	in	÷	5940	=	L/min

List your nozzle options by referring to a manufacturer's catalogue.

Nozzle Size				
Nozzle Pressure kPa(psi)				
Nozzle Output L/min				
Forward Speed km/h (mph)				
Delivery Rate L/ha (L/acre)				

- Forward speed** changes will adjust the delivery rate. Slower speeds increase the amount sprayed in a field, and faster speeds reduce it. If your delivery rate is 112L/acre at 6 mph, then by halving your speed to 3 mph you'll double the delivery rate to 224 L/acre.

Use these formulas to calculate alternative combinations of delivery rates and speeds.

present forward speed	x	present delivery rate	÷	new forward speed	=	new delivery rate
km/h	x	L/min	÷	km/h	=	L/min
mph	x	L/min	÷	mph	=	L/min

Speed changes are usually made by using a different gear in order to keep tractor RPMs within the range recommended for the sprayer pump.

present forward speed	x	present delivery rate	÷	new delivery rate	=	new forward speed
km/h	x	L/min	÷	L/min	=	km/h
mph	x	L/min	÷	L/min	=	mph

When you have chosen a new gear, check with your nozzle supplier on which nozzle to use or calculate the new nozzle output (same formula as Step 1).

delivery rate	x	forward speed	x	nozzle spacing	÷	constant	=	new nozzle output
L/ha	x	km/h	x	cm	÷	60,000	=	L/min
L/acre	x	mph	x	in	÷	5940	=	L/min

- Spray pressure should be set for the correct droplet size.** Changing pressure is recommended only for very small changes in delivery rates. Otherwise your droplet size will change and cause drift or runoff problems. Since pressure must be increased four times to double the delivery rate, this is not a good way to adjust delivery rate.

**After making the adjustments, measure the delivery rate again. Fill in a new Calibration Worksheet.**

When your equipment is accurately calibrated and applying the desired delivery rate, you are then ready to spray. Use the Pesticide Use Calculations worksheet to determine how much pesticide to buy and how much pesticide to add to a full or partial tank.

# Pesticide Use Calculations —Per Area Rate

Example: Pesticide Labels read: "use 3L/ha in 1000L of water" or "use 3L/1000L of water/ha".

Pesticide \_\_\_\_\_ Pest \_\_\_\_\_ Crop \_\_\_\_\_ Date \_\_\_\_\_

Fill in values for only one column – hectares or acres. Use only hectares or only acres; don't mix them.

Use litres (L) for all liquid volumes. Use the *italicized* line if you are using acres.

Field area \_\_\_\_\_ ha \_\_\_\_\_ acres (hectares = 0.4 x acres)

Spray tank capacity \_\_\_\_\_ L \_\_\_\_\_ L (L = 3.79 x US gal. L = 4.55 x Imperial gal.)

Pesticide label application rate \_\_\_\_\_ kg or L/ha \_\_\_\_\_ kg or L/acres (L/acres = 0.4 x L/ha)

Spray volume \_\_\_\_\_ L/ha \_\_\_\_\_ L/acres (from label or production guide or field test)

Check your Calibration Worksheets and choose a suitable sprayer setup and Sprayer Delivery Rate

Sprayer Delivery Rate \_\_\_\_\_ L/ha \_\_\_\_\_ L/acres

Copy values into the formulas below where needed.

**How much pesticide to buy?**

field area	x	pesticide label application rate	x	# applications per year	=	pesticide to buy
ha	x	kg or L/ha	x		=	kg or L
acres	x	kg or L/acres	x		=	kg or L

**Full tank**

**Area covered by a full tank?**

tank capacity	÷	sprayer delivery rate	=	area covered
L	÷	L/ha	=	ha/tank
L	÷	L/acre	=	acres/tank

**How much pesticide to add to a full tank?**

pesticide label application rate	x	area covered by a full tank	=	pesticide to add
kg or L/ha	x	ha/tank	=	kg or L
kg or L/acre	x	acres/tank	=	kg or L

**Number of tankfuls required for area?**

field area	÷	area covered by a full tank	=	tankfuls required
ha	÷	ha/tank	=	tanks
acre	÷	acres/tank	=	tanks

**Partial tank**

Measure the area to be sprayed by the last tank accurately to avoid mixing too much spray.

**How much spray mix to make for a partial tank?**

sprayer delivery rate	x	area remaining	=	spray mix to make in partial tank
L/ha	x	ha	=	L
L/acre	x	acres	=	L

**How much pesticide to add to a partial tank?**

pesticide label application rate	x	area remaining	=	pesticide to add to partial tank
kg or L/ha	x	ha	=	kg or L
kg or L/acre	x	acres	=	kg or L

# Pesticide Use Calculations —Per Dilution Rate

Example: Pesticide Label reads: "use 1L/1000L of water and spray foliage thoroughly".

Pesticide \_\_\_\_\_ Pest \_\_\_\_\_ Crop \_\_\_\_\_ Date \_\_\_\_\_

Fill in values for only one column – hectares or acres. Use only hectares or only acres; don't mix them.

Use litres (L) for all liquid volumes. Use the *italicized* line if you are using acres.

Field area \_\_\_\_\_ ha \_\_\_\_\_ acres (hectares = 0.4 x acres)  
 Spray tank capacity \_\_\_\_\_ L \_\_\_\_\_ L ( L = 3.79 x US gal. L = 4.55 x Imperial gal.)  
 Pesticide label dilution rate \_\_\_\_\_ kg or L/1000L of water (may be another amount of water)  
 Spray volume \_\_\_\_\_ L/ha \_\_\_\_\_ L/acres (from label, production guide, or field test)

Check your Calibration Worksheets and choose a suitable sprayer setup and Sprayer Delivery Rate

Sprayer Delivery Rate \_\_\_\_\_ L/ha \_\_\_\_\_ L/acres

Copy values into the formulas below where needed.

## How much pesticide to buy?

field area	x	pesticide label dilution rate	x	sprayer delivery rate	x	# applications per year	=	pesticide to buy
ha	x	kg or L/1000L	x	L/ha	x		=	kg or L
acres	x	<i>kg or L/1000L</i>	x	<i>L/acres</i>	x		=	<i>kg or L</i>

## Full tank

Area covered by a full tank?

tank capacity	÷	sprayer delivery rate	=	area covered
L	÷	L/ha	=	ha/tank
L	÷	<i>L/acre</i>	=	<i>acres/tank</i>

How much pesticide to add to a full tank?

pesticide label dilution rate	x	tank capacity	=	pesticide to add
kg or L/1000L	x	L	=	kg or L
<i>kg or L/1000L</i>	x	<i>L</i>	=	<i>kg or L</i>

Number of tankfuls required for area?

field area	÷	area covered by a full tank	=	tankfuls required
ha	÷	ha/tank	=	tanks
<i>acre</i>	÷	<i>acres/tank</i>	=	<i>tanks</i>

## Partial tank

Measure the area to be sprayed by the last tank accurately to avoid mixing too much spray.

How much spray mix to make for a partial tank?

sprayer delivery rate	x	area remaining	=	spray mix to make in partial tank
L/ha	x	ha	=	L
<i>L/acre</i>	x	<i>acres</i>	=	<i>L</i>

How much pesticide to add to a partial tank?

pesticide label dilution rate	x	spray mix in partial tank	=	pesticide to add to partial tank
kg or L/1000L	x	L	=	kg or L
<i>kg or L/1000L</i>	x	<i>L</i>	=	<i>kg or L</i>

# Forward Speed Calculations

Date: \_\_\_\_\_

Calculate the forward speed of your tractor and sprayer in field conditions encountered during spraying. If you change tires, tire pressures, or tire lugs wear significantly, speeds will change. Also speeds will change between dry and very wet field conditions.

1. Mark out a test strip at least 60 m or 200 ft long.
2. Fill the tank about half full with water and move to the test strip.
3. Choose the tractor gear and throttle for the forward speed you want. Gear \_\_\_\_\_  
Throttle \_\_\_\_\_ rpm. Use the same throttle RPM when measuring nozzle output (Step 7).
4. Measure the time in seconds required to pass through the test strip on four runs. Reach the desired speed *before* entering the test strip, and hold that speed constant throughout the test run.

1st run \_\_\_\_\_ + 2nd run \_\_\_\_\_ + 3rd run \_\_\_\_\_ + 4th run \_\_\_\_\_ = \_\_\_\_\_ seconds total time.

5. Calculate total distance travelled. Multiply test strip length (Step 1) by the number of runs.  
Your strip was \_\_\_\_\_ m(ft) long x \_\_\_\_\_ runs = \_\_\_\_\_ m(ft) total distance.

6. Calculate forward speed using the formula in the box at right.

total distance + total time x constant = forward speed

m	+	sec	x	3.6	=	km/h
ft	+	sec	x	0.68	=	mph

Tractor #1 \_\_\_\_\_ Tire Size \_\_\_\_\_ Tire Pressure \_\_\_\_\_

Gear					
Throttle	rpm				
Time	sec				
Total distance	in (ft)				
Forward speed	km/h (mph)				

Tractor #2 \_\_\_\_\_ Tire Size \_\_\_\_\_ Tire Pressure \_\_\_\_\_

Gear					
Throttle	rpm				
Time	sec				
Total distance	in (ft)				
Forward speed	km/h (mph)				

# Sprayer Setup Summary

Sprayer \_\_\_\_\_ Tractor \_\_\_\_\_ Tune-Up #: \_\_\_\_\_

Farm \_\_\_\_\_ Date: \_\_\_\_\_

Sprayer Setup #	
Measured (calculated) Delivery Rate _____ L/acre	_____ US gal/acre
Tank Volume _____ L	_____ US gal
Area Sprayed by a Full Tank _____ acre	
Tractor Gear _____ throttle	_____ rpm
Forward Speed _____ mph	_____ km/hr
# of Nozzles _____ swath width	_____ ft
Nozzle (size/type) _____	
Pressure @ Regulator _____ @ nozzles	_____

Sprayer Setup #	
Measured (calculated) Delivery Rate _____ L/acre	_____ US gal/acre
Tank Volume _____ L	_____ US gal
Area Sprayed by a Full Tank _____ acre	
Tractor Gear _____ throttle	_____ rpm
Forward Speed _____ mph	_____ km/hr
# of Nozzles _____ swath width	_____ ft
Nozzle (size/type) _____	
Pressure @ Regulator _____ @ nozzles	_____

Sprayer Setup #	
Measured (calculated) Delivery Rate _____ L/acre	_____ US gal/acre
Tank Volume _____ L	_____ US gal
Area Sprayed by a Full Tank _____ acre	
Tractor Gear _____ throttle	_____ rpm
Forward Speed _____ mph	_____ km/hr
# of Nozzles _____ swath width	_____ ft
Nozzle (size/type) _____	
Pressure @ Regulator _____ @ nozzles	_____

Sprayer Setup #	
Measured (calculated) Delivery Rate _____ L/acre	_____ US gal/acre
Tank Volume _____ L	_____ US gal
Area Sprayed by a Full Tank _____ acre	
Tractor Gear _____ throttle	_____ rpm
Forward Speed _____ mph	_____ km/hr
# of Nozzles _____ swath width	_____ ft
Nozzle (size/type) _____	
Pressure @ Regulator _____ @ nozzles	_____

Sprayer Setup #	
Measured (calculated) Delivery Rate _____ L/acre	_____ US gal/acre
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Tractor Gear _____ throttle	_____ rpm
Forward Speed _____ mph	_____ km/hr
# of Nozzles _____ swath width	_____ ft
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Area Sprayed by a Full Tank _____ acre	
Tractor Gear _____ throttle	_____ rpm
Forward Speed _____ mph	_____ km/hr
# of Nozzles _____ swath width	_____ ft
Nozzle (size/type) _____	
Pressure @ Regulator _____ @ nozzles	_____