Messenger®

A biochemical pesticide used for plant disease management, insect suppression, and plant growth enhancement.

Wettable Dry Granule

ACTIVE INGREDIENT:
Harpin protein: 3.0%
OTHER INGREDIENTS: 97.0%
Total: 100.0%

EPA Reg. No. 69834-2
EPA Est. No. 69834-WA-001

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Net Weight: _____

INDEX:

ACCEPTED
JUL 22 2002
Under the Federal Insecticides, Fungicide, and Rodenticide Act, as amended, for the pesticide registered under EPA Reg. No. 69834-2

KEEP OUT OF REACH OF CHILDREN
CAUTION
PRECAUCION

Si usted no entiende la etiqueta, busque a alguien para que se la explique a usted en detalle (If you do not understand the label, find someone to explain it to you.)

IMPORTANT

BEFORE USING THIS PRODUCT, READ THE ENTIRE PRECAUTIONARY STATEMENTS, DIRECTIONS FOR USE, STORAGE AND DISPOSAL INSTRUCTIONS, GENERAL INFORMATION, USE ADVISORIES, AGRICULTURAL USE REQUIREMENTS, AND CONDITIONS OF SALE AND EXCLUSIVE WARRANTY.

IF THE CONDITIONS OF SALE AND EXCLUSIVE WARRANTY ARE NOT ACCEPTABLE, RETURN THIS PRODUCT UNOPENED WITHIN THIRTY (30) DAYS OF PURCHASE TO THE PLACE OF PURCHASE.

1.0 PRECAUTIONARY STATEMENTS

Hazard to Humans & Domestic Animals

CAUTION

1.1 Personal Protective Equipment (PPE):
Applicators and other handlers of this product must wear:
- Long-sleeved shirt and long pants.
- Shoes and socks.
- Particulate dust mask, when mixing.

1.2 User Safety Recommendations: Users should wash hands before eating, drinking, chewing gum, using tobacco or using the toilet.

Environmental Hazards

1.3 Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment washwaters.

2.0 DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling. Do not apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area during application. For any requirement specific to your State or Tribe, consult the agency responsible for pesticide regulation.

3.0 AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard, 40 CFR part 170. This standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE), notification to workers, and restricted-entry interval. The requirements in this box apply to uses of this product that are covered by the Worker Protection Standard.

Do not enter or allow worker entry into treated areas during restricted entry interval (REI) of 4 hours.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil or water, is:
- Coveralls over long-sleeved shirt and long pants;
- Waterproof gloves; and
- Shoes and socks.

4.0 NOTICES TO USER

4.1 Conditions of Sale and Exclusive Warranty: The Directions for Use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness of the product, or other unintended consequences may result because of such factors as horticultural practices, use with other products (unless otherwise expressly provided in the Directions for Use of this product), presence of other materials, the manner of use or application, and various environmental conditions, including but not limited to weather conditions and moisture conditions. All of the aforementioned risks are beyond the control of EDEN Bioscience Corporation and all such risks shall be assumed by the Buyer.

4.2 Exclusive Warranties: EDEN Bioscience Corporation warrants that at the time of the first sale of this product it conforms to the chemical description on the label and under normal conditions is reasonably fit for the purposes referred to in the Directions for Use, subject to inherent risks referred to above. If this product does not perform as warranted above, customer's sole remedy for breach of that warranty shall be replacement of the product or refund of the purchase price paid, at the option of EDEN Bioscience Corporation. TO THE FULL EXTENT ALLOWED BY LAW, THE FOREGOING WARRANTIES AND REMEDIES ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER WARRANTIES, TERMS, OR CONDITIONS, EXPRESS OR

IMPLIED, EITHER IN FACT OR BY OPERATION OF LAW, STATUTORY OR OTHERWISE, INCLUDING BUT NOT LIMITED TO WARRANTIES, TERMS, OR CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND SATISFACTORY QUALITY.

4.3 **Limitation of Liability:** To the full extent allowed by law, EDEN Bioscience Corporation excludes for itself and its suppliers any liability, whether based in contract or tort (including negligence), for incidental, consequential, indirect, special, or punitive damages of any kind, or for loss of revenue or profits, loss of business, or crop injury arising out of or in connection with the sale, use, injury, performance, or failure of this product, even if EDEN Bioscience Corporation or its authorized reseller has been advised of the possibility of such damages, and limits its liability to replacement of the product, or a refund of the purchase price paid, at the option of EDEN Bioscience Corporation. This disclaimer of liability for damages will not be affected if any remedy provided herein fails of its essential purpose.

4.4 **Assumption of Risk:** Buyer and Users of this product assume the risk of any use contrary to the Directions for Use (Sections 2.0 and 8.0) and/or all of the risks inherent in the use of this product as set forth above. EDEN Bioscience Corporation offers this product, and the Buyer and User accept it, subject to the foregoing Conditions of Sale and Exclusive Warranty, which may be varied only by agreement in writing signed by a duly authorized representative of EDEN Bioscience Corporation.

4.5 **Prompt Notice of Claim:** EDEN Bioscience Corporation must have prompt notice as soon as Buyer or User has reason to believe they may have a claim (not to exceed twenty-one days from date of application) so that an inspection of the affected property and growing crops may be made. Unless Buyer and Users shall promptly notify EDEN of any claims, they shall be barred from obtaining any remedy.

4.6 **Tank Mixes:** Tank mixing or use of this product with any other product which is not specifically and expressly authorized by the label shall be the exclusive risk of User, Applicator, and/or Application Advisor. Read and follow the entire label of each product to be used in a tank mix with this product.

5.0 STORAGE AND DISPOSAL

5.1 **General:** Do not contaminate water, food, or feed by storage and disposal. Keep product away from exposure to air, sunlight, moisture, or heat. After opening, use promptly.

5.2 **Storage:** Store dry and out of direct sunlight. Do not store in temperatures over 110° F for more than seven days.

5.3 **Disposal:** Wastes resulting from use of this product may be disposed of on site or at an approved waste disposal facility.

5.4 **Container Disposal:** Completely empty bag into application equipment. Then dispose of empty bag in a sanitary landfill or by incineration or, if allowed by State and local authorities, by burning. If burned, stay out of smoke.

6.0 PRODUCT INFORMATION

The active ingredient in Messenger is a protein produced naturally by certain bacteria and other microbes. Messenger stimulates the plant's pest suppression systems and enhances plant growth. These beneficial effects can result in reduced reliance on traditional chemicals for pest control and greater production.

The ability of Messenger to initiate disease resistance, insect suppression, and to enhance plant growth will vary among crops and conditions. Messenger has no direct effect on insects or pathogens and the product's efficacy is based on its ability to activate the plant's own defense and growth mechanisms. Plants require 5-7 days to fully induce resistance.

7.0 IPM USE

7.1 **Start Messenger IPM Program Early:** Messenger is recommended for use as part of an IPM (Integrated Pest Management) strategy to combat expected plant diseases and/or pests. Best results will be obtained when Messenger is applied as early as possible in the life cycle of the crop followed by repeat applications through harvest. Repeat applications should be made at regularly timed intervals or to coincide with key physiological events such as flowering, fruit or boll set, etc. Apply other pest control products as needed if greater control is desired.

7.2 **Preventative Treatment and Required Activation Period:** Messenger is a preventative treatment and must be applied at least 5-7 days prior to expected disease or pest infestation.

7.3 **Scouting:** Close scouting and early attention to infestations of pests or pathogens is highly recommended.

8.0 GENERAL DIRECTIONS FOR USE

8.1 **Sites:** Messenger may be used for greenhouse, shadehouse, nursery, and field production of all crops listed on this label.

8.2 **Days to Harvest:** Messenger may be applied up to or after harvest.

8.3 **Coverage:** Use spray volume adequate to obtain coverage without run-off. Uniform or full leaf coverage is helpful but is not required. All new foliage should be contacted.

8.4 **Recommended Rates:** Use the labeled rates for all applications. Increasing the amount of Messenger by increasing the rate will not improve the product's performance.

8.5 **Spray Intervals:** Messenger should be applied approximately every 14 days. Under heavy pest pressure, shortening of spray intervals will not improve and may actually decrease the effectiveness of Messenger. Under heavy pest pressure, use another pest control product for additional protection.

8.6 **Non-Ionic Spreader-Stickers:** Only non-ionic spreader-stickers, which have been approved for use on growing and harvested crops may be used.

8.7 **Tank Mixing:** Messenger may be tank mixed with other labeled pesticides to enhance control. Use of the resulting tank mix must be in accordance with the more restrictive label limitations and precautions. No dosage rates should be exceeded. This product cannot be mixed with any product containing a label prohibition against such mixing. **Before tank-mixing Messenger with other labeled products, including spreader-stickers, check for tank mix compatibility (see Section 9.4).**

9.0 USE ADVISORIES

9.1 **Chlorine:** Messenger is sensitive to degradation by chlorine. Avoid using chlorinated water when possible.

9.2 **pH:** Messenger may be inactivated by strongly acidic or basic tank mixes. Do not use Messenger in tank mixes or water below pH 5.0 or above 10.0.

9.3 **Use Promptly:** Use product within 4 hours of mixing into water. Do not use product from a package that has been opened more than 24 hours.

9.4 **Tank Mix Compatibility:** Messenger may be inactivated by exposure to strong oxidizing agents or to materials that are strongly acidic or basic.

- Do not mix this product with pyrophosphates, phosphoric acid, or other strong oxidizers.
- Do not use Messenger in tank mixes below pH 5.0 or above 10.0.

Messenger is a protein, therefore compatibility with inorganic salts, chemicals using clay-based formulas, or other materials in a tank mix cannot be assured under all circumstances.

9.5 **Fertilization:** Photosynthesis and nutrient uptake are elevated in Messenger treated plants. Therefore, User must closely monitor plant development and adjust fertilization practices as necessary to maintain the proper developmental stages of plant growth.

9.6 **Early Ripening:** Crops treated with Messenger may be ready for harvest one or more weeks earlier than non-treated crops. User must monitor crop for early ripening or maturity and harvest accordingly.

9.7 **Rain: Do not apply during rain. Reapplication is not necessary if treatments have been applied at least 30 minutes before rain begins.**

10.0 APPLICATION AND MIXING INSTRUCTIONS

10.1 Water: Clean ditch, pond, or well water may be used with Messenger. Messenger is sensitive to degradation by chlorine (found in many municipal water sources) and certain other chemicals. For best results pre-treat water with EDEN Bioscience's Water Treatment Agent (WTA) (supplied with Messenger). WTA is a common material that will help protect Messenger's active ingredient from chlorine or other harmful chemicals.

10.2 Mixing Instructions: Mix Messenger as follows:

- Add water to the mix tank and provide gentle agitation.
- Add WTA. Continue gentle agitation.
- Add the required amount of Messenger. Agitate until dissolved and avoid excessive foaming.
- Add a non-ionic spreader-sticker (if desired) and other spray materials to be tank mixed, if any, to the mix tank. Only materials which have been approved for use on growing and harvested crops may be added.
- Continue gentle agitation for approximately 5 minutes. Apply promptly.

10.3 Application and Water Volume: Messenger may be applied with conventional ground or aerial equipment with quantities of water sufficient to provide coverage of top of the plant or new foliage. Uniform coverage is not required but may be helpful. The volume of water required per acre will depend on crop development, relative humidity, spray equipment, and local experience. For ground applications, the selection of spray volumes of 25 to 150 gallons of water per acre is recommended. For optimal results, use at least 3 gallons of water per acre by air except in arid areas, where 5 to 10 gallons may be required.

10.4 Spray Drift for Aerial Application: Avoiding spray drift at the application site is the responsibility of the applicator. The interactions of many equipment-and-weather-related factors determine the potential for spray drift. The applicator and the grower are responsible for considering all these factors when making decisions.

10.5 Seed Treatment: Messenger may be used to treat seeds. Apply 0.35-5.00 oz. Messenger per 60-100 lbs. seed as a pre-plant seed treatment using standard seed treatment equipment. Mix thoroughly and plant. Messenger may be mixed with some other commercial seed treatments. Use of the resulting mix must be in accordance with the more restrictive label limitations and precautions.

10.6 Application via Sprinkler, Drip, or Chemigation Systems: General Statements: Messenger may be applied through most sprinkler, drip, or chemigation systems. If you have questions about your system's calibration, you should contact State Extension Service Specialists, equipment manufacturer or other experts. Do not connect an irrigation system (including greenhouse systems) used for pesticide application to a public water system. A person knowledgeable about the chemigation system and responsible for its operation, or under the supervision of the responsible person, shall shut the system down and make necessary adjustments should the need arise.
System Requirements: The system must contain a functional check valve, vacuum relief valve and low-pressure drain, appropriately located on the irrigation pipeline to prevent water source contamination from back-flow. The pesticide injection pipeline must contain a functional, automatic, quick-closing check valve to prevent the flow of fluid back toward the injection pump. The pesticide injection pipeline must also contain a functional, normally closed, solenoid-operated valve located on the intake side of the injection pump and connected to the system interlock to prevent fluid from being withdrawn from the supply tank when the irrigation system is either automatically or manually shut down. The system must contain functional interlocking controls to automatically shut off the pesticide injection pump when the water pump motor stops. The irrigation line or water pump must include a functional pressure switch that will stop the water pump motor when the water pressure decreases to the point where pesticide distribution is adversely affected. Systems must use a metering pump, such as a positive displacement injection pump (e.g., diaphragm pump), effectively designed and constructed of materials that are compatible with pesticides and capable of being fitted with a system interlock. Do not apply when wind-speed favors drift beyond the area intended for treatment.

11.0 APPLICATION RATES AND SPECIFIC CROP INSTRUCTIONS

Use the tables below to determine the application rates for Messenger as a foliar spray. Follow specific crop instructions for application timing and frequency.

11.1 Vegetable Application Rates and Specific Crop Instructions

Crop	Oz/Acre
Artichoke	2.25 – 9.00
Asparagus	2.25 – 9.00
Cucurbits such as Cucumber, Melon, and Squash	2.25 – 9.00
Fruiting Vegetables such as Tomato, Pepper, Okra, and Eggplant	2.25 – 9.00
Leafy and Cole Crops such as Bok Choy, Broccoli, Cabbage, Cauliflower, Celery, Chard, Lettuce, and Spinach	2.25 – 9.00
Onion, Garlic, and Scallion	2.25 – 9.00
Sweet Corn	2.25 – 9.00

- **ARTICHOKE**
  Uses: Messenger is recommended to boost overall vigor and production of artichokes and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as a foliar spray at approximately 14-day intervals beginning at new growth.
- **ASPARAGUS**
  Uses: Messenger is recommended to boost overall vigor and production of asparagus and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as a foliar spray at approximately 14-day intervals beginning at new growth in spring.
- **CUCURBITS (such as cucumber, melon, and squash)**
  Uses: Messenger is recommended to boost overall production of cucurbits and to aid in management of diseases such as CMV (cucumber mosaic virus) and TMV (tobacco mosaic virus).
  Time and Methods of Application: Messenger may be applied as foliar sprays beginning at first true leaf and repeated at approximately 14-day intervals.
- **EGGPLANT**
  Uses: Messenger is recommended to boost overall production of eggplant and to aid in management of diseases such as CMV (cucumber mosaic virus).
  Time and Methods of Application: Messenger may be applied as two overhead drenches (2.25 – 4.4 oz/50 gallons) to greenhouse seedlings. A drench may be applied approximately 3 weeks after seeding and a second 5-7 days before transplanting. Earlier or later drenches may be applied as desired. After transplanting, foliar sprays are recommended at approximately 14-day intervals beginning 7 days after transplanting. If no drench has been applied begin applications at approximately 14-day intervals as early as possible.
- **LEAFY AND COLE CROPS (such as bok choy, broccoli, cabbage, cauliflower, celery, chard, lettuce, and spinach)**
  Uses: Messenger is recommended to boost overall production of leafy and cole crops and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as a seed treatment or as foliar sprays beginning at first true leaf and repeated at approximately 14-day intervals.
- **ONION, GARLIC, and SCALLION**
  Uses: Messenger is recommended to boost overall production of onion, garlic and scallions and to aid in the management of disease.

Time and Methods of Application: Messenger may be applied as a seed treatment or as foliar sprays beginning at first true leaf and repeated at approximately 14-day intervals.

- **PEPPER**
  Uses: Messenger is recommended for peppers to boost overall production and to aid in management of diseases such as bacterial leaf spot (*Xanthomonas campestris* pv. *vesicatoria*) and Phytophthora root rot (*Phytophthora capsici*).
  Time and Methods of Application: Messenger may be applied as a drench (2.25 – 4.4 oz/50 gallons) to greenhouse seedlings. A drench may be applied approximately 3 weeks after seeding and a second 5-7 days before transplanting. Earlier or later drenches may be applied as desired.
  After transplanting, foliar sprays are recommended at approximately 14-day intervals through harvest beginning 2 weeks after the last greenhouse drench. If no drench has been applied, begin applications at approximately 14-day intervals as early as possible. If no treatments have been applied previously, begin at planting or as soon as practical. For direct-seeded pepper, applications at approximately 14-day intervals are recommended beginning at first true leaf.
- **SWEET CORN**
  Uses: Messenger is recommended to boost overall growth and production of corn and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as a pre-plant seed treatment followed by foliar sprays at approximately 14-day intervals beginning at complete emergence.
- **TOMATO**
  Uses: Messenger is recommended for tomatoes to boost overall production and to aid in management of diseases and pests such as bacterial leaf spot (*Xanthomonas campestris* pv. *vesicatoria*), bacterial speck (*Pseudomonas syringae* pv. tomato), bacterial wilt (*Pseudomonas solanacearum*), Fusarium wilt (*Fusarium oxysporium*), Phytophthora root rot (*Phytophthora capsici*), CMV (cucumber mosaic virus), and root-knot nematodes (*Meloidogyne spp.*).
  Time and Methods of Application: Messenger may be applied as a drench (2.25 – 4.50 oz/50 gallons) to greenhouse seedlings. A drench may be applied approximately 3 weeks after seeding and a second 5-7 days before transplanting. Earlier or later drenches may be applied as desired.
  After transplanting, foliar sprays are recommended at approximately 14-day intervals through harvest beginning 2 weeks after the last greenhouse drench. If no drench has been applied, begin applications at approximately 14-day intervals as early as possible. For direct-seeded tomato, applications at approximately 14-day intervals are recommended beginning at first true leaf.

11.2 Field Crop Application Rates and Specific Crop Instructions

Crop	Oz/Acre
Corn (grain or silage and popcorn)	2.25 – 9.00
Field Crops such as Cotton and Peanut	2.25 – 9.00
Forage Crops such as Alfalfa hay and Timothy hay	2.25 – 9.00
Legume Vegetables such as Beans (dry and fresh), Peas (dry and fresh), Lentils, and Soybeans	2.25 – 9.00
Oil and Oil-Seed Crops such as Canola (rape seed), Jojoba, Mint (peppermint and spearmint), Safflower, Sesame, and Sunflower	2.25 – 9.00
Root Crops such as Beets, Carrots, Ginger root, Ginseng, Parsnips, Radish, Rutabagas, and Turnips	2.25 – 9.00
Sugar Cane	2.25 – 9.00
Tobacco	4.50 – 13.35
Tuber Crops such as Potato, Sweet Potato, and Yams	2.25 – 9.00

- **CORN (grain or silage and popcorn)**
  Uses: Messenger is recommended to boost overall growth and production of corn for grain or silage and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as a pre-plant seed treatment followed by foliar sprays at approximately 14-day intervals beginning at complete emergence.
- **COTTON**
  Uses: Messenger is recommended for use on cotton to boost overall growth and production and to aid in the management of disease and suppression of certain insect pests.
  Time and Methods of Application: Messenger may be applied as a seed treatment and as a foliar spray. Foliar sprays may be applied at first true leaf, first bloom, and 21 days after first bloom to boost overall growth and production. For suppression of pests, apply Messenger prior to infestation and continue at approximately 14-day intervals.
- **FORAGE Crops (alfalfa and timothy)**
  Uses: Messenger is recommended to boost overall growth and production of forage hays (alfalfa and timothy) and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as a seed treatment or as foliar sprays at approximately 14-day intervals beginning after new growth commences or after each cutting. For newly seeded crops, begin sprays at first true leaf.
- **LEGUME VEGETABLES (beans and other legumes)**
  Uses: Messenger is recommended to boost overall growth and production of beans and other legumes and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as a seed treatment and as foliar sprays at approximately 14-day intervals beginning at first true leaf.
- **OIL and OIL-SEED CROPS (Canola and other oil and oil-seed crops)**
  Uses: Messenger is recommended to boost overall vigor and production of oil seed crops such as canola and sunflower and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as a seed treatment or as foliar sprays beginning at complete emergence and followed at approximately 14-day intervals through harvest.
- **PEANUT**
  Uses: Messenger is recommended to boost overall growth and production of peanuts and to aid in management of diseases such as leaf spot diseases (*Cercospora* sp. and *Cercosporidium* sp).
  Time and Methods of Application: Messenger may be applied as a seed treatment followed by foliar sprays at approximately 14-day intervals beginning at first true leaf.
- **POTATO**
  Uses: Messenger is recommended to boost overall growth and production of potatoes and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning at full emergence or as a seed treatment.
- **ROOT CROPS (beets and other root crops)**
  Uses: Messenger is recommended to boost overall vigor and production of beets and other root crops such as carrots and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as a seed treatment and as foliar sprays at approximately 14-day intervals beginning at first true leaf.
- **SUGAR CANE**
  Uses: Messenger is recommended to boost overall growth and production of sugar cane and to aid in the management of disease.
  Time and Method of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning after new growth commences or after each cutting.
- **TOBACCO**
  Uses: Messenger is recommended for tobacco to boost overall growth and production and to aid in management of diseases and pests such as blue mold (*Peronospora*

tabacina), Fusarium wilt (*Fusarium oxysporum*), Tobacco cyst nematode (*Globodera solanacearum*) and TMV (tobacco mosaic virus).
Time and Methods of Application: Messenger may be applied as pre-emergence root drenches (4.50 – 13.35 oz/50 gallons) applied at 14-day intervals beginning with first irrigation in the greenhouse or direct-seeded bed. Foliar sprays are recommended at approximately 14-day intervals beginning 7 days after transplanting through harvest.

11.3 Small Grain Application Rates and Specific Crop Instructions

Crop	Oz/Acre
Rice	2.25 – 9.00
Small Grains such as Barley, Flax, Oats, Sorghum, Rye, and Wheat	2.25 – 9.00

- **RICE**
  Uses: Messenger is recommended to boost overall growth and production of rice and to aid in management of diseases such as stem rot (*Sclerotium oryzae*), bacterial leaf blight (*Xanthomonas oryzae*), and sheath blight (*Rhizoctonia solani*).
  Time and Methods of Application:
  Pre-germinated Rice: Messenger may be applied as a pre-plant (approx. 8 hrs. or overnight) seed soak (2.25 – 4.4 oz/50 gallons) before planting followed by a foliar application at complete emergence.
  Non-Pre-germinated Rice: Messenger may be applied as a seed treatment or as foliar applications at approximately 14-day intervals beginning at complete emergence.
- **WHEAT and BARLEY and other small grains**
  Uses: Messenger is recommended to boost root growth, production, and overall plant vigor for wheat or barley and to aid in management of diseases such as wheat sheath blight (*Rhizoctonia solani*).
  Time and Methods of Application: Messenger is applied as a pre-plant seed treatment followed by foliar sprays as needed for management of wheat sheath blight.

11.4 Tree and Vine Application Rates and Specific Crop Instructions

Crop	Oz/Acre
Avocado	6.67 – 13.35
Berries and Small Fruit such as Blackberry, Blueberry, Boysenberry, Cranberry, Currant, Raspberry, and Strawberry	2.25 – 13.35
Citrus such as Grapefruit, Mineolas, Lemon, Lime, Orange, Pumelo, Tangelo, and Tangerine	6.67 – 13.35
Trees such as Conifer and Broad-leaf	6.67 – 13.35
Nut Trees such as Almond, Filbert, Macadamia, Pecan, Pistachio, and Walnut	6.67 – 13.35
Pome Fruit such as Apple and Pear	6.67 – 13.35
Stone Fruit such as Cherry, Olive, Nectarine, Peach, Plum, and Prune	6.67 – 13.35
Vines such as Grape (juice, raisin, table and wine), Kiwifruit, and Hops	4.50 – 13.35

- **ALMOND (and other nut trees such as walnut, pistachio, and filbert)**
  Uses: Messenger is recommended to boost overall vigor and production of nut trees such as almond, walnut, pistachio, and filbert and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning with new spring foliage growth.
- **APPLE**
  Uses: Messenger is recommended to boost overall vigor and production of apple and to aid in management of diseases such as apple scab (*Venturia inaequalis*) and fire blight (*Erwinia amylovora*).
  Time and Methods of Application: Messenger may be applied as 2 pre-bloom sprays beginning at green tip and again 7-10 days later, followed by post-bloom sprays at approximately 14-day intervals.
- **AVOCADO**
  Uses: Messenger is recommended to boost overall vigor and production of avocado and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning at new spring growth flush.
- **CHERRY and other stone fruit crops**
  Uses: Messenger is recommended to boost overall vigor and production of cherry and other stone fruit crops and to aid in the management of disease.
  Time and Methods of Application: Messenger is applied as 2 pre-bloom sprays beginning at green tip and again 7-10 days later, followed by post-bloom sprays at approximately 14-day intervals.
- **CITRUS**
  Uses: Messenger is recommended to boost overall vigor and production of citrus and to aid in management of diseases such as bacterial leaf spot (*Xanthomonas campestris pv citrumelo*), citrus scab (*Elsinoe fawcettii*), greasy spot (*Mycosphaerella citri*), and *Alternaria* brown spot (*Alternaria alternata pv citri*).
  Time and Methods of Application: Messenger may be applied by foliar spray at approximately 14-day intervals beginning at initial flush.
- **CRANBERRY**
  Uses: Messenger is recommended to boost overall production and to improve coloration in cranberries and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning when new shoot growth is present.
- **GRAPES (such as juice, raisin, table and wine) and other vine crops**
  Uses: Messenger is recommended to boost overall growth and production of grapes and to aid in management of diseases such as *Botrytis* bunch rot (*Botrytis cinerea*) and black rot (*Guignardia bidwellii*).
  Time and Methods of Application: Messenger may be applied to grapevines as foliar sprays at approximately 14-day intervals beginning when new shoot growth is present.
- **PEAR**
  Uses: Messenger is recommended to boost overall vigor and production of pear and to aid in management of diseases such as fire blight (*Erwinia amylovora*).
  Time and Methods of Application: Messenger is applied as 2 pre-bloom sprays beginning at green tip and again 7-10 days later, followed by post-bloom sprays at approximately 14-day intervals.
- **RASPBERRY AND BLUEBERRY and other cane berries**
  Uses: Messenger is recommended to boost overall growth and production of raspberries and blueberries and to aid in management of diseases such as *Botrytis* (*Botrytis cinerea*).
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning when new shoot growth is present.
- **STRAWBERRY**
  Uses: Messenger is recommended to boost overall growth and production of strawberries and to aid in management of diseases such as *Botrytis cinerea* and Fusarium wilt (*Fusarium oxysporium*).
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals while plants are actively growing, beginning in the greenhouse or nursery, and after transplanting. For fall transplanted strawberries resume applications in spring.
- **TREES (such as conifer and broad-leaf)**

Uses: Messenger is recommended to boost overall growth and production of conifers and to aid in management of diseases such as *Botrytis* gray mold (*Botrytis cinerea*).
Time and Methods of Application: Messenger may be applied as a pre-plant seed treatment immediately before planting followed by foliar sprays at approximately 14-day intervals beginning after complete emergence.

11.5 Ornamental and Turf Application Rates and Specific Crop Instructions

Crop	Oz/Acre
Ornamentals such as Fresh Cut Flowers, Bedding Plants and Green Foliage Plants	4.50 – 13.35
Rose	2.25 – 9.00
Turf	2.25 – 9.00

- **ORNAMENTALS**
  Uses: Messenger is recommended to boost overall growth and production of greenhouse and field grown ornamentals (cut flowers, bedding, and green foliage plants). For geranium, Messenger is also recommended to aid in management of diseases such as bacterial leaf blight (*Xanthomonas campestris pv pelargonii*).
  Time and Methods of Application: For greenhouse bedding plants: Messenger may be applied at approximately 14-day intervals as irrigation drenches directly to seeded flats or cuttings. For field-grown plants, Messenger may be applied as foliar sprays at approximately 14-day intervals once plants have fully leafed out or beginning approximately 7 days after transplant.
- **ROSE**
  Uses: Messenger is recommended to boost overall growth and production of rose and to aid in management of diseases such as black leaf spot (*Diplocarpon rosae*).
  Time and Methods of Application: Messenger may be applied as foliar sprays beginning 7 days after grafted cuttings are planted and continuing at approximately 14-day intervals.
- **TURF**
  Uses: Messenger is recommended to boost overall growth and vigor of turf grass and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as a seed treatment for overseeded or newly seeded turf followed by foliar sprays at approximately 14-day intervals beginning 14 days after full emergence.

11.6 Specialty Crop Application Rates and Specific Crop Instructions

Crop	Oz/Acre
Aloe	4.50 – 13.35
Banana	4.50 – 13.35
Coffee	6.67 – 13.35
Figs	6.67 – 13.35
Herbs such as Basil, Chives, and Cilantro	2.25 – 9.00
Mango	6.67 – 13.35
Papaya	6.67 – 13.35
Pineapple	6.67 – 13.35
Taro Root	4.50 – 13.35

- **ALOE**
  Uses: Messenger is recommended to boost overall growth and vigor of aloe and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning 7 days after new spring growth emerges.
- **BANANA**
  Uses: Messenger is recommended to boost overall growth and vigor of banana and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning 7 days after new growth is initiated.
- **COFFEE**
  Uses: Messenger is recommended to boost overall growth and vigor of coffee and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning 7 days after new growth is initiated.
- **FIGS**
  Uses: Messenger is recommended to boost overall growth and vigor of fig trees and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning 7 days after new spring growth is initiated.
- **HERBS**
  Uses: Messenger is recommended to boost overall growth and vigor of herbs and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning 7 days after new spring growth is initiated.
- **MANGO**
  Uses: Messenger is recommended to boost overall growth and vigor of mango trees and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning 7 days after new growth is initiated.
- **PAPAYA**
  Uses: Messenger is recommended to boost overall growth and vigor of papaya and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning 7 days after new growth is initiated.
- **PINEAPPLE**
  Uses: Messenger is recommended to boost overall growth and vigor of pineapple and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning 7 days after new growth is initiated.
- **TARO ROOT**
  Uses: Messenger is recommended to boost overall growth and vigor of taro root and to aid in the management of disease.
  Time and Methods of Application: Messenger may be applied as foliar sprays at approximately 14-day intervals beginning 7 days after new growth is initiated.

11.7 Grasses Grown for Seed Application Rates and Specific Crop Instructions

- **GRASSES GROWN FOR SEED: 2.25 – 9.00 Oz/Acre**
  Uses: Messenger is recommended to boost overall growth and vigor and to aid in the management of disease in turf grasses grown for seed such as blue grasses, fescues, and rye grasses, and forage grasses grown for seed such as fescues, orchard grasses, timothys, bromes, wheat grasses, and other native species.
  Time and Methods of Application: Messenger may be applied as a seed treatment followed by foliar sprays at approximately 14-day intervals beginning 14 days after full emergence.

12.0 GREENHOUSE DRENCH APPLICATION

Mix 2.25 – 4.50 oz. Messenger per 50 gallons of water. Apply solution immediately by traveling boom at a height and speed appropriate to thoroughly drench seedlings. Do not apply additional irrigation to plants for at least 30 minutes following application.

13.0 LIMITED USE LICENSE AND PATENTS

The contents of this package and/or the use of the contents are covered by U.S. Patent Nos. 5,849,868, 5,859,324, 5,776,889, 5,977,060 and 6,277,814 as well as pending patent applications. The purchase of this package grants the Buyer a license, under these patents and patent applications, to use its contents only for treating plants, plant seeds, and other plant parts as described herein.

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