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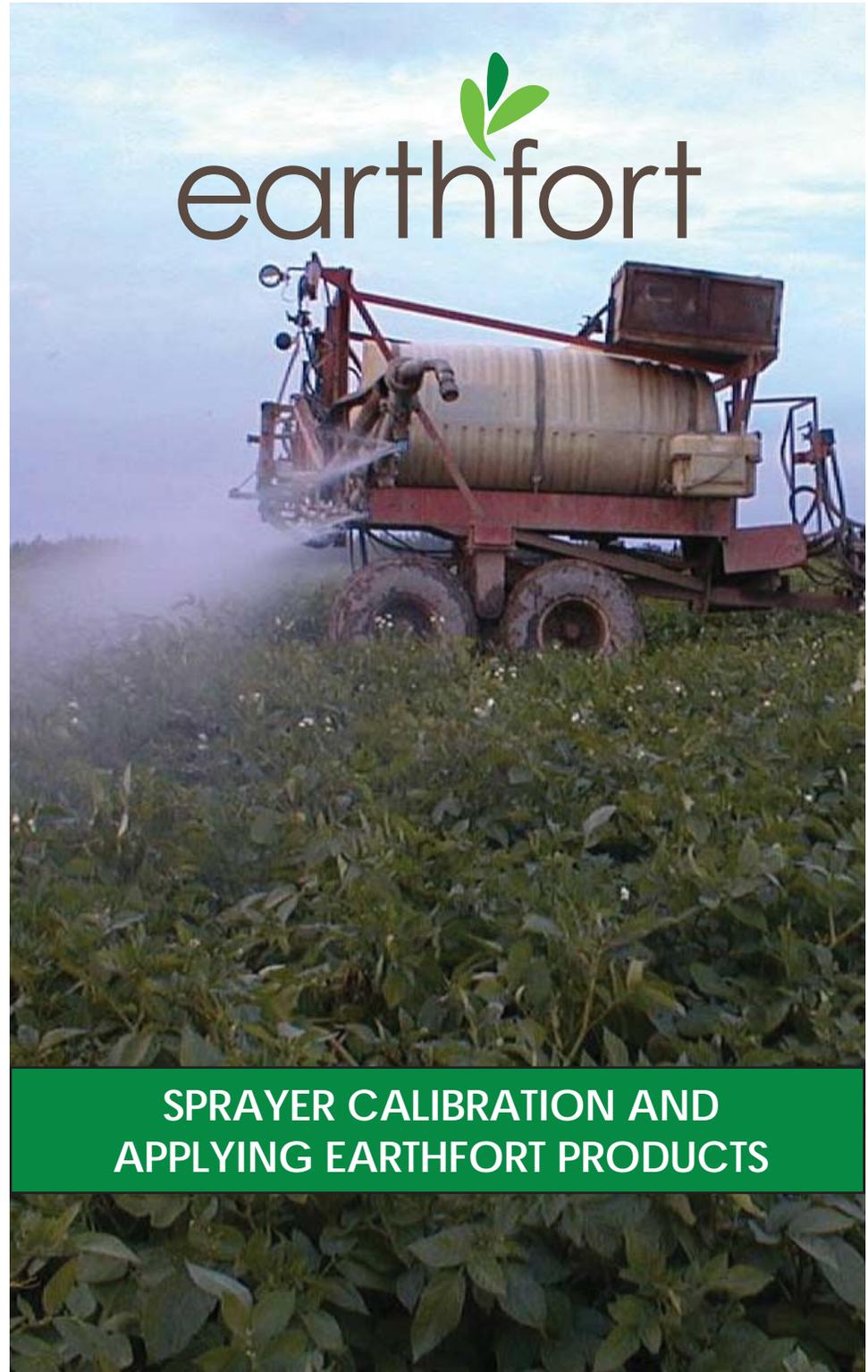
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**SPRAYER CALIBRATION AND
APPLYING EARTHFORT PRODUCTS**



Measure it, manage it.

With a little homework, knowing how your spray equipment operates can help you save time and money. This guide can help you get started!

THE BENEFITS OF HEALTHY SOIL

Soil health is the ability of a soil to perform essential ecosystem functions, such as nutrient cycling, water filtration, and habitat for plants and animals. Healthy soil is teeming with life; micro-organisms perform many of these important soil ecosystem functions.

When the health of the biology in the soil is disturbed by sudden changes to the ecosystem (e.g., over-tilling or application of any fungi/herb/pesticides), overall soil health is affected. Crop protection products are effective; but not selective. When practices that damage soil biology are regularly employed, the soil becomes cyclically dependent upon amendments and the soil's ability to perform nutrient cycling through biology is continually impaired.

The biological approach to soil re-establishes the soil ecosystem to rebuild the desired operations and properties that can enable soil to return to a healthy functioning state. Follow-up treatments with Earthfort products will replenish and invigorate beneficial microbes to your soil and help restore the balance of organisms to keep your soil functioning.

BEFORE YOU GET STARTED

Earthfort products are made from natural, organic materials. Due to the nature of these materials and organisms, some particulate (non-soluble) matter will always be present.

For optimal spraying equipment performance please follow the guidelines below:

- Equipment screens should be 40 mesh (400 microns) or larger.
- Nozzle tips should be 40 mesh (400 microns) or larger.
- Pre-mixing and screening the product can be helpful.
- Always have some water in the tank before adding Earthfort products.
- To keep the product uniformly distributed in the tank, we highly recommend agitating and/or recirculating the mixture continually.

Questions about your specific equipment and site? Call our office to set up a consultation at 541-257-2612.

CALCULATING APPLICATION RATES

Earthfort products are typically used with water as a carrier over a given piece of land. Once you've chosen the product or products you would like to apply, you must determine the amount of spray mix needed for the application. This amount will vary depending on the tank size, the spray volume per acre, the acres of land to cover and the required application rate given on the product label. If you do not know the application rate of your spray equipment, it is worth your time to figure this out.

Before mixing and applying Earthfort Products, it is very important to make sure that your spray equipment is clean of fertilizer and/or product residues. Soil biology organisms are sensitive to the salts and killing agents in these residues and careless use of our products in contaminated sprayers can yield little benefit. Refer to your equipment's manual for maintenance and cleaning information. When cleaning equipment of residues use proper safety equipment and be sure to wash the equipment out in an area where the runoff will not affect important plant production areas, landscaping or nearby waterways.

To determine the amount of Earthfort product(s) to add to the spray tank, you need to know:

- The **recommended application rate of product.** (This amount is listed on the bottle, usually indicated as pounds per acre for soluble powders and pints, quarts, or gallons per acre for liquids.)
- The **capacity of the spray tank.** (It is ideal for the tank to have accurate gallon markings and be placed on level ground so you can add accurate amounts of product to water.)

- The **calibrated output of the sprayer**. (Even if you know what the output is, it is important to check your equipment periodically to make sure it is performing at the expected rate and make adjustments if it is not.)

To calibrate your nozzles, you must calculate the gallons per minute (GPM) output per nozzle, determine the actual speed at which you will run your equipment in miles per hour, and measure the nozzle spacing (Width) in inches. Clean all strainers and nozzle screens before calibrating. Make sure all nozzles are in good working order. It is a good idea to check the output of each nozzle to make sure there is not more than 10% variance amongst them. Checking nozzles may seem tedious, but spraying only the precise amount of product you need to apply can save you money in the long run.

To determine the GPM output of the nozzle, catch the output from each nozzle for 1 minute (or for 30 seconds, then double the amount) and use the measurement you get in the equation below:

$$\frac{\text{_____ ounces per minute}}{128 \text{ ounces per gallon}} = \text{_____ gallons per minute (GPM)}$$

To determine speed, measure out a known distance, measure the seconds needed to travel that distance under field conditions, and use the equations below:

$$\frac{\text{_____ feet}}{\text{_____ seconds}} = \text{_____ feet per second}$$

$$\frac{\text{_____ feet per second}}{1.467} = \text{_____ miles per hour (MPH)}$$

Now you're ready to calibrate your spray nozzles:

$$\frac{5940 \times \text{GPM}}{W \times \text{MPH}} = \text{_____ Gallons per Acre}$$

GPM = gallons of spray delivered per minute per nozzle
 MPH = miles per hour of actual travel speed in the field
 W = width of nozzle spacing in inches (Check nozzles for uniform spray pattern and possible defects or poor function.)
 5,940 = This number converts inches and feet and minutes and hours to gallons and acres.

LET'S GIVE IT A GO

(The numbers shown below are for demonstration purposes only, your numbers may vary.)

Example 1: According to the label, Soil ProVide™ calls for 2.5 gallons per acre. The sprayer being used has a 500 gallon tank and is calibrated at 8 gallons per acre. How much product should be added to the spray tank?

Step 1. Determine the number of acres that can be sprayed with each tankful.

$$\frac{500 \text{ gallon tank capacity}}{8 \text{ gallons per acre spray rate}} = 62.5 \text{ acres covered per tankful}$$

Step 2. Determine the amount of product needed per acre by checking the label or our online crop specific application rates. In this case, we're growing alfalfa so we will apply 2 gallons of product per acre.

Step 3. Determine the amount of product to add to each tankful. Each tankful will cover 62.5 acres (Step 1), and 2.5 gallons of product per acre (Step 2) is needed.

62.5 acres x 2 gallons per acre = 125 Gallons of product added to each tankful

Example 2: According to the label, Soil ReVive™ calls for 1 pound per acre.

Step A. Determine the number of acres that can be sprayed with each tankful.

$$\frac{\text{500 gallon tank capacity}}{\text{8 gallons per acre spray rate}} = \text{62.5 acres covered per tankful}$$

Step B. Determine the pounds of product needed per acre, check product application rates for the type of crop you are growing. In this example we will say it is a half of a pound.

Step C. Determine the amount of product to add to each tankful. Each tankful will cover 62.5 acres (Step A) and .5 pounds of product per acre is needed (Step B).

62.5 acres x .5 pounds per acre = 31.25 pounds of product added to each tankful

*"Anyone that grows should use Earthfort. Being able to decipher what type of microbes you have/need is crucial to performance in plant cultivation."
-Rob Turner, Intelligrowth Ind*

IS YOUR SOIL IMPROVING?

How do you know if what you are doing is helping the biology your soil? You have it tested. Earthfort's laboratory tests soil samples from around the world. The results of this evaluation will help determine how to manage the soil microbes to meet the needs of your target crop. If you can measure it, you can manage it!

Different plants have different soil biology preferences. Just like you, there are tools you like to use and tools that sit in the box because they just aren't as good a fit. Some plants like grasses and annual flowers prefer bacterial dominated soils, whereas others like woody shrubs and trees prefer fungally dominated soils. When you have your soil tested for biology, we can tell you what kind of biology dominates your soil and if that is ideal for your crop or not.

For example, if you discover through testing that your soil is bacterially dominated and you have an orchard on that soil, we can help you steer the soil's microbiology toward a more fungally dominated system. Once the soil is adjusted this way, you will likely find that your plants begin to thrive with less inputs and weeds may diminish too!

Sometimes, you must to apply a crop protecting spray, knowing that this unselective tool may knock back some of your beneficial soil organisms. Testing again provides useful way for you to track how much the soil ecosystem was changed and helps you bring it back to pre-treatment conditions.

More information can be found at our website regarding the taking of samples, what kind of testing assays we perform, as well as how to package and ship your samples safely to us. Go to **www.earthfort.com** and look under the Lab Services tab for all your testing needs.

PRODUCT SAFETY and HANDLING

The following excerpts are from the Material Safety Data Sheets (MSDS) for Soil ProVide and Soil ReVive. Full MSDS sheets are available for these products at earthfort.com.

PRODUCT NAME: Soil ProVide

PRODUCT USE: Soil Amendment

INGREDIENTS

Hazardous Ingredients: None

PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Liquid

Appearance: Dark brown liquid

Odor: Mild earthy scent or no odor

Solubility in Water: 100%

Percent Solids by Weight: <1%

HANDLING AND STORAGE

Store in cool, dry place.

PERSONAL PROTECTIVE EQUIPMENT

Gloves: No special requirements, but gloves recommended

Respirator: No special requirements

Eye protection: Safety glasses to avoid contact with eyes

Footwear: No special requirements

Clothing: No special requirements

Other: No special requirements

Engineering controls: Normal ventilation

Leak and spill procedures: Flush away with water

Special shipping information: Avoid temperatures above 120°F

FIRST AID MEASURES

Eye Contact: Flush with cool water

Skin Contact: Wash with soap and water

Ingestion: Induce vomiting and consult a physician

FIRE AND EXPLOSION DATA

Flammable or combustible: Not flammable or combustible

Flashpoint: None

Upper flammable limit: N/A

Lower flammable limit: N/A

Auto ignition temperature: N/A

Flammability classification: N/A

Conditions of flammability: N/A

Special fire fighting procedures: N/A

Hazardous combustion products: N/A

Shock sensitivity: Non sensitive

Static discharge sensitivity: Non sensitive

REACTIVITY DATA

Product stability: Product viability unstable at temperatures above 120°F

Conditions of reactivity: None

Incompatible substances: disinfectants, bleach, strong acids, strong bases

DISPOSAL CONSIDERATIONS

Waste Disposal Method: Not classified as hazardous waste.

Product may be disposed of according to local procedures.

TOXICOLOGICAL PROPERTIES

Primary routes of exposure: Eye contact and skin contact

Exposure limits: None

Effects of acute exposure: Irritation

Sensitizer: Not known to be a sensitizer

Carcinogen: No

Mutagen: Not known to be a mutagen

Teratogen: Not known to be a teratogen

PRODUCT NAME: Soil ReVive

PRODUCT USE: Soil amendment

INGREDIENTS

Hazardous Ingredients: None

PHYSICAL AND CHEMICAL PROPERTIES

Physical state: Soluble powder

Appearance: Grey powder

Odor: slightly fermented odor

Solubility in Water: Soluble

pH: 7.3 ±0.5

HANDLING AND STORAGE

Store in cool, dry place.

PERSONAL PROTECTIVE EQUIPMENT

Gloves: No special requirements, but gloves recommended

Respirator: Filter mask recommended

Eye protection: Safety glasses to avoid contact with eyes

Footwear: No special requirements

Clothing: No special requirements

Other: No special requirements

Engineering controls: Normal ventilation

Leak and spill procedures: Flush away with water

Special shipping information: Avoid temperatures above 120°F

FIRST AID MEASURES

Eye Contact: Flush with cool water

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Conditions of reactivity: None

Incompatible substances: disinfectants, bleach, strong acids, strong bases

DISPOSAL CONSIDERATIONS

Waste Disposal Method: Not classified as hazardous waste.

Product may be disposed of according to local procedures.

TOXICOLOGICAL PROPERTIES

Primary routes of exposure: Eye contact, inhalation, and skin contact

Exposure limits: None

Effects of acute exposure: Irritation

Sensitizer: Not known to be a sensitizer

Carcinogen: No

Mutagen: Not known to be a mutagen

Teratogen: Not known to be a teratogen

PREPARATION INFORMATION: *The MSDS is prepared on basis of information given by manufacturer. Data given here is solely for the guidance in safe handling and use of product by customers; they do not form part of any specification. The above information on Earthfort's products is based on experience, but it is always advisable for customers to satisfy themselves through consultation with knowledgeable bodies and small scale testing to determine if these products are suitable for their purpose under their conditions of use.*

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