

How to Use and Present DIEHARD™ Mycorrhizal Inoculants in Landscaping and Turf.

By James J. Quinn, President
Horticultural Alliance, Inc.
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Components/Products

Product Comparisons - PHC
February 20, 2006

	FLOWER BED	PHC Flower Saver	DIEHARD Flower Bed	Diff.
Cost per 100 sq. ft.		\$46.80	\$27.95	-40%
Rate per 100 sq. ft. in pounds		6	3	-50%
INGREDIENTS:				
ENDO Propagules Per 100 sq. ft.	19800		25614	29%
Yucca %			1	NO YUCCA
Soluble Sea Kelp per 100 sq. ft. in grams	436		447	3%
Humic Acid per 100 sq. ft. in grams	654		210	-68%
CFU's Beneficial Bacteria Per Lb.	1,500,000,000		1,500,000,000	0%
CFU's Trichoderma Per 100 sq. ft.	NONE		2,250,000,000	NO TRICHODERMA
Helper Bacteria Included	Yes	Yes	Yes	None

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Forward

The purpose of writing this booklet is to familiarize the reader with the numerous applications of micro-stimulants including mycorrhizal fungus inoculants, *Trichoderma* fungi, beneficial bacteria, humic acids, sea kelp, amino acids, plant hormones, vitamins and proteins. Each has an established list of sponsors that either use the products, or have “proven” their worth in scientific research they have conducted. The generalization that each single ingredient can alter the health and well being of a plant is well established.

There shall be no “hard”, or “soft” sell of the value the ingredients contained in these products have on plants. No attempt is made here to present the technical side of these ingredients, or whether they have a positive effect on plants, soil, or the environment. These products have over 100 proven ingredients in each one. Combined, research papers supporting the use and value of these ingredients number over 40,000. If you question one, or two, or even the value of ten of these ingredients understand that leaves 90% to do the job. Be reasonable and move forward or join the crowd that wishes to do more research.

Combining all of these ingredients will individually have an effect on the plant, the soil environment and structure, and the overall health of the plant and root zone. Our intent when formulating the products was to make sure that the products simply cannot be used without seeing a difference.

Use this booklet as a quick guide of how to use these products. As you personally gain actual experience through using the products yourself, through working with customers and testimonials from your customers, you will begin to realize that these products are truly unique in the value that they offer your customers.

Predictably when this happens you will in turn tell more of your friends, and they will tell their friends. You will sell more, making yourself even more valuable to you customers.

Components/Products

Product Comparisons - PHC
February 20, 2006

	PHC Tree Saver	DIEHARD Transplant	Diff.	Actual Diff.*
TREE SAVER vs. DIEHARD Transplant				
Cost to treat a 2" caliper tree	\$5.26	\$4.25	-19%	
INGREDIENTS:				
ENDO Propagules Per Inch Caliper	994	1,385	39%	
ECTO Spores Per Inch Caliper	17,812,500	22,500,000	26%	
Gel Per Inch Caliper (gm.)	33	33	0%	
Yucca %	1.6	4	162%	215%
Sea Kelp Meal %	24	13	-46%	-25%
Humates %	11	24	122%	163%
Sugar %	3.7	NONE	NO SUGAR	
CFU's Beneficial Bacteria Per Inch Caliper	60,750,000	100,000,000	65%	
CFU's Trichoderma Per Inch Caliper	NONE	150,000,000	NO TRICHODERMA	
Helper Bacteria Included	Yes	Yes	None	

* Percentage differences are in fact an additional 33% higher than this because we apply 4 oz. of product per inch caliper compared to PHC's 3 oz. rate.

Everyone will win including the environment and you will feel the satisfaction of knowing that you are a part of making the world a better place, of doing the right thing.

Have a good journey. Pay special attention to what you are seeing and listen carefully to the questions that you get and soon you will be an expert on how to present these natural systems.

Respectfully,

Jim Quinn
President & Founder
Horticultural Alliance, Inc.
Sarasota, Florida
January 2007



D – Competitive Comparisons

When you use DIEHARD™ products you have "**DIEHARD™ Confidence**" it is the absolute best product with the most active ingredients available anywhere. While other companies spend their resources on slick literature and advertising we put our's in the bag for you, our valued customer. Trees, shrubs and turf respond to ingredients, not fancy literature and PhD's on staff. Over the years, this COMPETITIVE COMPARISONS page has been a major reason for significant changes in competitive product formulations. They have changed their formulations to try and match ours. By the time they copy us we have already changed again.

In fact, one of our customers reported being asked to change to a competitive product and told them "No, DIEHARD™ products have the highest level of ingredients at the best price." The competitors regional rep replied, "Ya, every time we change our formulation to meet theirs they make theirs even better". Well, we consider that statement an earned complement, as well as a testament to the fact that our company is unquestionably closer to our customers needs than any other in our industry. Our goal has always been to make the best possible product that we can and the above comparisons clearly show this.

Here are a couple comparisons with our biggest competitor Plant Health Care, Inc. The company's stock is traded in Great Britain and as such, their financial data is public record. Their record shows that they have not been profitable but are very good at selling stock.

Manganese (Mn)

- Functions with enzyme systems involved in breakdown of carbohydrates, nitrogen metabolism.
- Soil is a source of manganese.

Zinc (Zn)

- Essential for the transformation of carbohydrates.
- Regulates consumption of carbohydrates
- Part of the enzyme systems that regulate plant growth.

Water Management Gel

- Holds soluble fertilizers in the root zone slow releasing the soluble thereby reducing leaching
- Increases soil water holding capacity and availability
- Increases water infiltration, soil aeration, soil friability, and soil permeability.
- Reduces compaction
- Improves micro flora and bacterial content of soil
- Reduces iron chlorosis in plants
- Improves nutrient soil/moisture osmotic plant uptake
- Reduced transplant stress Increased yields, survival

Introduction

Mycorrhiza--- An Introduction

General Comments

The full story of what effect mycorrhizal roots have on plants is still evolving. We know that some plants cannot live without mycorrhizal roots. We also know there are some plants that do not need mycorrhizae. Most brassicas, for example, which include broccoli, brussels sprouts, cabbage, and cauliflower, do not associate with mycorrhizal fungi. However, the fact is that nearly all plant life is dependent on the association with mycorrhizal fungi. Mycorrhizal fungi grow through the soil by extending its hyphae, which are the “roots” of the fungus, into the soil. These “roots” are extremely fibrous and engulf every tiny crack and cranny in the soil that absorb water and nutrients in solution for a more efficient uptake by the roots of the plant.

What Are Mycorrhizas?

Mycorrhizas are highly evolved mutualistic relationships between roots, fungi, and soils. This symbiotic relation, believed to have begun over 400 million years ago, is credited with enabling life to move from water to land. Scientists believe that over 70% of the biomass in soils is this fungus.

How It Works

The only food source for mycorrhizal fungi comes from the plant. Thus, if anything begins to slow the food flow, the mycorrhizal fungi becomes more active, and aggressive, to gather and deliver water and nutrients to its host - the roots of the plant. This is why plants in stressed conditions benefit from mycorrhizal roots. Regardless of the cause, i.e., drought, heat, high salt, windburn, freeze, parasites, negative organisms, etc., mycorrhizae has evolved for millions of years to bring relief and protect the plant. Mycorrhizae are a natural phenomenon.

How It Is Used

There are five ways to use DIEHARD™ brand mycorrhizal “cocktails”:

1. Add to growing media.
2. Broadcast over surfaces prior to planting or seeding and then working into the ground.
3. Added to water and mixed with a gel to treat roots, root balls, planting holes and seed.
4. Added to water and injected, or drenched, into the root zone of trees and shrubs.
5. As a seed coating.

General Benefits

1. Increased plant water supply by greatly increasing the water extraction function of the root/fungus symbiosis working towards the mutual good of both.
2. Increase plant available nutrient supply by making available to the plant nutrients that are otherwise not usable to the plant.
3. The mutualisms of the root-fungi associations have established unquestioned abilities for both to adapt to all manner of alien forces both in, and aboveground.
4. Boosts, in hundreds of orchestrated ways, overall health and vitality of plants by enabling the full potential of immune and growth systems that may otherwise not establish.

Results Supported By Research

1. Increased Survival
2. Increase Rooting
3. Increased Flowering
4. Water Absorption
5. Increased nutrient availability
6. Increased reproductive success
7. Increase yields
8. Increased drought resistance
9. Increased resistance to parasitic fungi and nematodes
10. Reduction of competing non-host plants
11. Nutrient transfer through networks of hyphae between dominant trees to emerging seedlings

Langbeinite

Originating from evaporated seawater, it contains Sulfur, Potash, Magnesium and many other important trace elements.

Vitamins & Enzymes

- B, B2, B3, B6, B7, B12, C, E and K.
- Riboflavin, biotin, choline, thiamine, pantothenic acid, folic acid, and niacin.
- Enhance the properties of fertilizer and are essential for the basic metabolic processes of the plant such as chlorophyll production, cell division, transpiration and respiration.

Minor Element Package

Boron (B)

- Helps in the use of nutrients and regulates other nutrients.
- Aids production of sugar and carbohydrates.
- Essential for seed and fruit development.
- Sources of boron are organic matter and borax

Copper (Cu)

- Important for reproductive growth.
- Aids in root metabolism and helps in the utilization of proteins.

Chloride (Cl)

- Aids plant metabolism.
- Chloride is found in the soil.

Iron (Fe)

- Essential for formation of chlorophyll.
- Sources of iron are the soil, iron sulfate, and chelated iron.

- **PSUEDOMONAS: (2 SPECIES)**
Psuedomonas aureofaceans (2 strains): anti-fungal
- **STREPTOMYCES : (2 SPECIES)**
Streptomyces lydicus (2 strains): anti-fungal

12. Provides nutrient transfer through networks of hyphae between dead to living plants.
13. Hyphae transfer nutrients from plant roots to other members of the decomposition food chain.
14. Increase microbial populations and activities.
15. Contribute significantly to the establishment and maintenance of a “natural” soil structure.
16. This list could go on for over one hundred pages.

Carbohydrates

Simple sugars and starches provide an immediate surge of energy for the beneficial microorganisms during initial organic matter degradation.

Sea kelp

Contains more than 60 macro and trace elements.

Amino Acids

- Enhances health and improves the overall nutrient efficiency by buffering heavy metals and sodium in the soil.
- Improve the availability and exchange of plant nutrients on the root surface, and microbial activity in the soil.

Humus

- Composed of a complex mixture of colloidal substances containing of lignin, protein, and polyuronides and carbon that improves the exchange capacity of the soil and enhances uptake of phosphates and other essential micronutrients.
- Increases plant vigor, helps keep fertilizer from leaching through the soil, and buffers plants against extreme concentrations of salts.

Fish Meal

Dried ground tissue of whole fish or fish cuttings, which contains Nitrogen and is rich in essential amino acids.

Other Ingredients (*See Appendix D for a more thorough discussion on the value of the ingredients used in our products.*)

Our approach is to combine ingredients in our products so that it is virtually impossible to use the products without seeing a significant difference. Here is a short list of our ingredients and the benefits that they individually bring to the products:

Trichoderma and other beneficial fungi

Trichoderma is a recognized beneficial fungus used to compete with the food source and space of negative causing fungi in the soil. Spores of the fungus, when mixed with soils, germinate and grow around plant roots depriving negative fungi the living space and food source thereby causing death to them, therefore preventing fungal diseases.

Landscaping &, Turf

Transplanting, Flower Beds & Maintenance

Why DIEHARD™ Is Necessary:

Plants grown by the nursery industry look good, but are not “natural”. Nurseries today produce commodities. Production focus is to grow plants at the lowest possible cost and in the shortest possible time. “Natural systems” (plant immune, nutrient acquisition and numerous defense systems) that have evolved over millions of years do not develop in a commercial nursery because under the micro-managed production

techniques that are employed no such systems are needed. Whatever is needed to grow plants quickly is done. Consequently, these plants do not know how to deal with drought, pests, water acquisition, increased salt levels, varying pH levels, and hundreds of other conditions that exist in the landscape world outside of the nursery.

In nature, nothing happens without a cause. The nursery industry today, like all commodity manufacturers, produces products according to the specifications of its customers. The specifications are solely based upon physical appearance, i.e., size, caliper, height, etc. Since nursery production, landscaping, and maintenance functions are separate and distinct entities those that establish the specifications for each of these view these products as separate non-connected products. Nearly all of the transition “problems” that plants encounter between leaving the nursery to becoming established in the landscape are generalized with the umbrella term “transplant shock”. This costs the industry hundreds of millions of dollars per year in plant replacements, labor, equipment wear and tear and opportunity costs (lost profits from other jobs available but declined due to limited resources). In Texas, for example, the expected loss rate for planted trees is as high as 10%. These costs are absorbed by developers (guarantee provisions in contracts), landscape contractors (all have “grave yards and over-purchase for expected resets), and nursery growers. The use of DIEHARD™ mycorrhizal “cocktails” when transplanting significantly reduces these costs.

Sales Tips

Sell DIEHARD™ by selling Reduced Costs using:

- **Natural systems**
- **Mycorrhizal fungus**
- **Beneficial Bacteria**
- *Trichoderma*
- **Biostimulants**
- **Water Management**

- Enhances soil biology by inoculating the soil with beneficial microbes, and providing a food source to maintain them in a soil.

Effects on plants

- Contains nitrogen fixing *Bacillus* species that converts atmospheric nitrogen to available nitrogen for plants, a phosphate-solubilizing bacillus that converts insoluble phosphorus to soluble, and a growth hormone promoting bacillus that stimulates root growth.
- Stimulates plant growth by naturally accelerating cell division.
- Stimulates root formation and growth.
- Increases plant cell membrane permeability allowing for more efficient uptake of water, nutrients and oxygen.
- Reduces transplant shock.
- Increases plant membrane permeability for more efficient nutrient uptake. Stimulates root growth, respiration and formation, the presence of soil microorganisms and plant enzymes.

KEY MICROBIAL COMPONENTS include:

- *BACILLUS*: (32 species)
 - Bacillus azotofixans* (2 strains): nitrogen fixation
 - Bacillus azotoformans* (3 strains): nitrogen fixation, plant growth hormones
 - Bacillus megaterium* (2 strains): decomposition, nutrient cycling
 - Bacillus polymyza* (5 strains): anti-fungal, nitrogen fixation, nutrient cycling
 - Bacillus thuringiensis* (2 strains): entomopathogenic
 - Bacillus licheniformis* (6 strains): enzymes, plant growth hormones, soil structure
 - Bacillus pumulis* (2 strains): decomposition, nutrient cycling
 - Bacillus subtilla* (10 strains): anti-fungal

- Increases the rate of development in root systems.
- Increases vitamin content of plants.
- Increases the permeability of plant membranes; promoting the uptake of nutrients.
- Stimulates root growth, especially lengthwise.
- Increases root respiration and formation.
- Stimulates growth and proliferation of desirable soil microorganisms as well as algae and yeasts.
- Aids in photosynthesis.
- Stimulates plant enzymes.
- Acts as an organic catalyst.

Yucca Plant Extract

- Increases cell wall permeability allowing the roots to take up water and nutrients faster and easier.
- Increases microbiological activity.
- Inhibit ammonia production and nitrate accumulation.
- Is an effective wetting agent and promotes growth.
- Increases proliferation of organisms during high pH, copper poison and oxygen starvation stresses.
- Helps control nematodes - is toxic to a wide number of insects.
- Has been widely used for years as a soil conditioner.

Beneficial Bacteria

Effect on soil

- Converts soil elements, such as nitrogen and phosphorous, into plant available form.
- Increases conversion of soil elements, including phosphorous, into plant available forms.
- Adds in the decomposition of soil organics thereby making them available to the plant.
- \Increases soil buffering properties.
- Chelates metal ions in alkaline conditions, increasing plant availability

All of the important ingredients for the plant to become established and “naturalized”.

Conditions of Nursery Stock

- Nursery plants are extremely fragile. Wind burn during transit (not covered) - Plant dehydration - use DIEHARD™ Transplant in the medium or distribute between root ball and burlap when bailing.
- Grown at fastest possible rate - physiology of plant is high gear - use DIEHARD™ Transplant when transplanting to reduce stress through the introduction of organisms the plant must associate with to prosper and become protected from predators found in nature.
- Balled & Burlapped Trees and Shrubs - Water vital for new feeders - use DIEHARD™ Transplant between the root ball and burlap when bailing or when planting or DIEHARD™ Injectable injected into the root ball while the plant is in a holding area.
- Containerized plants grown with a Perched Water Table. This is gone when the container comes off. Use DIEHARD™ Transplant when planting to help replace the water managed during transition, as 29% of DIEHARD™ Transplant is Horta-Sorb®, water management gel.

Conditions at the Planting Site

- Site prep not complete (planting delayed) - If poorly held, losses/resets - use DIEHARD™ Transplant when planting.
- Irrigation system is not complete. Use DIEHARD™ Transplant to manage water delivered by hand during this period.
- Irrigation not used (hand watering) - High labor costs - cut 50% -- use DIEHARD™ Transplant to reduce frequency of watering.
- Poor drainage (expect root rot, losses) - Encourage shallow roots - use DIEHARD™ Transplant in the upper part of the planting pit to hold water (reducing

the level of water in the bottom of the planting pit). Product contains *Trichoderma* to play an important role in the long-term health of the roots in this kind of situation.

- Excessive drainage (high stress, losses) - High replacement costs - use DIEHARD™ Transplant when planting to hold water where it is needed—in the root zone.
- Time of year (summer heat, spring/fall winds) -High stress, resets, costs - use DIEHARD™ Transplant when planting to better manage water in the root zone and reduce costs.
- Remote location (long transit, high stress) -Watering, high cost - cut 50% with DIEHARD™ Transplant when planting to boost survival and establish natural defense systems in the ground and roots.

Conditions Following Installation

- Plant dry out (container conditions no longer exist, initial water needs are twice as high as in the nursery) - Stress, leaf drop, resets - cut with DIEHARD™ Transplant during installation.
- Irrigation system fails (equipment/design/ damage) - Hand watering, resets - insure with DIEHARD™ Transplant during installation.
- Irrigation designed for established landscape (not sufficient for initial establishment) - High stress, leaf drop - get maximum use of water available with DIEHARD™ Transplant during installation.
- Drought conditions prevail (high water needs) - Plant death, resets - insure with DIEHARD™ Transplant during installation and reduce labor, resets, and watering costs.

C – Other Ingredients and Their Benefits

Humic Acid

Physically modifies the soil.

- Increases water holding capacity.
- Increases aeration of soil.
- Improves soil workability.
- Helps resist drought.
- Improves seedbed productivity.
- Makes soil more friable or crumbly.
- Reduces soil erosion.

Chemically changes the fixation properties of the soil.

- Retains water-soluble inorganic fertilizers in the root zones and releases them to plants when needed.
- Promotes the conversion of a number of elements into forms available to plants.
- Possesses extremely high ion-exchange capacities.
- Participates in the decomposition of rocks and minerals.
- Increases buffering properties of soil.
- Chelates metal ions under alkaline conditions.
- Rich in both organic and mineral substances essential to plant growth.
- Increases percentage of total nitrogen in the soil.
- Provides the carbon necessary for humus building.
- Provides a multitude of carbon and anion exchange sites.
- Provides the organic chemicals for chelation of both major and

Biological benefits

- Stimulates plant growth by accelerating cell division.

Ectomycorrhizae

Alder	Chestnut	Hazelnut	Pine
Aspen	Chinquapin	Hickory	Poplar
Basswood	Eucalyptus	Larch	Spruce
Beech	Fir	Oak	Willow
Birch	Hemlock	Pecan	

Both Endomycorrhizae and Ectomycorrhizae

Alder	Cottonwood	Poplar
Aspen	Eucalyptus	Willow

Plant Species That Do Not Respond To Endo and Ectomycorrhiza

Azalea	Brussels	Heathers	Rhododendron
Beet	Cabbage	Macadamian	Rush
Blueberry	Carnation	Orchid	Sedge
Broccoli	Cranberry	Protea	

Ericoid Mycorrhiza

Azalea	Carnation	Rhododendron	
Blueberry	Cranberry		

Plant Species That Do Not Respond To Endo, Ecto or Ericoid

Broccoli	Brussels	Cabbage	Heathers
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“Certain Sell” Clients

1. Landscape Architects

- **ABSOLUTELY THE MOST IMPORTANT TIME THAT YOU CAN SPEND PRESENTING DIEHARD™ IS TO THE PROFESSIONAL LANDSCAPE ARCHITECT.** They specify DIEHARD™ Transplant BIG TIME. We have had numerous single jobs where the landscape architect has specified the use of our products in amounts over ten thousand pounds. Spend the time here and the pay-off is big. Focus on the “whales” – the ones that can specify tons on a project. If your goal is to build a significant market, spend at least 20% of your time with this professional. We have **never** met a landscape architect that was not interested in our approach and products.
- **Responsibility for problems encountered in a landscape installation rests with them.** Whatever the problem the client feels, the landscape architect has control – that is why they hired him/her to start with.
- **They have the responsibility of insuring that their projects employ the latest improved management techniques**—specify DIEHARD™ Transplant using the Specification Sheets presented in APPENDIX C or on line on our web page. If you have the opportunity of showing the LA the specification sheet do it!
- **Remember to point out that the Interactive Specification Sheet is the LA’s INTERNAL AUDITOR to correctly specify the AMOUNT OF PRODUCT needed for a specific project.** It is a very valuable tool for the LA to use to require the contractor to submit a receipt for the goods purchased for the job. If the LA specifies our product using a “generic” specification with wording requiring usage “According to manufacturers recommendation” the product that the contractor will search to find is the cheapest one possible and the interpretation of how much to use will also be understated. **THE INTERACTIVE SPECIFICATION calculates exactly how many**

pounds are needed AND specifies quantitatively the organisms required to meet the specification.

2. Government Agencies, i.e., Cities, Counties, State, & Federal

- City, county and state customers dealing with landscaping are found at:
 1. Parks (flower beds, turf, sport fields)
 2. General Services (gov't buildings and facilities)
 3. Roadways (tree programs, street tree programs_
- Municipalities, as a group, have a poor record with respect to landscape excellence. There are many reasons for this including tight resources, but we will say no more about the reasons here. The fact is that without exception they need our products, which will permit them to do a much better job with less cost. Point out to them the \$4.25 cost of using with a typical 2" caliper street tree.
- Municipalities (reduced budgets, little maintenance budgets for new plantings—they understand insurance)
- Stretched resources - use DIEHARD™ in all aspects of installations of plant materials, i.e., trees, shrubs, annual beds, interior, etc., to extend available labor and water—High mortality—use DIEHARD™ during installation to reduce these costs.

3. Landscape Contractors

- Tree plantings (high cost per unit) \$4.25 of DIEHARD™ treats a \$50-\$200 tree during installation. \$15 - \$20.00 is spent to stake the tree and how many dead, staked trees have you seen? The \$4.25 is a very low cost to insure that the tree survives and flourishes. The challenge here is to convince the contractor that there is effectively NO COST in using the product because of the significant effect upon transplant shock, watering, and maintenance.

B – Plant Species and Type of Mycorrhizae January 2006

Endomycorrhizae

Arborvitae	Carrot	Fescue	Locust	Paulownia	Sequoia
Acacia	Casuarina	Fig	London	Paw Paw	Silver bell
Agapanthus	Cassava	Ficus	Plane tree	Pea	Sourwood
Ailanthus	Catalpa	Forsythia	Magnolia	Peach	Soybean
Alder	Ceanothus	Fountain Grass	Mahogany	Peanut	Squash
Alfalfa	Cedar	Fuchsia	Mahonia	Pear	Strawberry
Almond	Celery	Gardenia	Mango	Pecan	Sudan Grass
Apple	Cherry	Garlic	Maples (all)	Pepper	Sugar Cane
Apricot	Chokeberry	Geranium	Marigold	Pistachio	Sumac
Artichoke	Chrysanthemum	Gingko	Melons (all)	Persimmon	Sunflower
Aspen	Citrus (all)	Grapes (all)	Mesquite	Pittosporum	Sweet Gum
Ash	Clover	Grass	Millet	Plum	Sweet potato
Asparagus	Coconut	Gum	Mimosa	Podocarpus	Sycamore
Avocado	Coffee	Hackberry	Morning	Poinsettia	Tea
Bamboo	Coral Tree	Hawthorn	Glory	Potato	Tobacco
Basil	Corn	Hibiscus	Mulberry	Poplar	Tomato
Bayberry	Cotton	Holly	Monkey	Rain tree	Tree-of-heaven
Bean	Cottonwood	Hop hornbeam	Pod	Raphiolepis	Tupelo
Begonia	Crabapple	Hombeam	Nasturtium	Raspberry	Walnut
Black Locust	Cryptomeria	Horsechestnut	Okra	Redbud	Wheat
Blackberry	Cucumber	Impatiens	Olive	Redwood	Willow
Box Elder	Currant	Jojoba	Onion	Rice	Yam
Buckeye	Cypress	Juniper	Pacific Yew	Rose	Yellow poplar
Bulbs	Dogwood	Kiwi	Palms (all)	Russian Olive	Yucca
Burning Bush	Eggplant	Leek	Palmetto	Ryegrass	
Cacao	Elm	Lettuce	Pampas Grass	Sassafras	
Cactus	Eucalyptus	Ligustrum	Papaya	Sagebrush	
Camellia	Euonymus	Lily	Passion Fruit	Serviceberry	

All nut trees except Pecan, Chestnut, Macadamia, and Hazelnut.

All fruit trees, grapevines, grasses and many vegetables

All berries except blueberry, cranberry and lingonberry.

in New York! Hey come on, you are in business. Ask questions and decide on your own...

- **EXCEPTIONAL Return on Investment** when used during installation.
- Real Estate Developers (lushness is important). Developers have budget funds available—use DIEHARD™ to insure lushness and reduced transplant shock, leaf drop, and unsightly dead trees and shrubs.
- Flowering annual beds—use DIEHARD™ amended 4-6 inches to reduce maintenance and watering and extend the time between plantings.

4. Retail Garden Centers

- Full Service Garden Centers (landscapers, architects, growers, etc.)
- Stretched resources—use DIEHARD™ to get the most productive use of labor.
- Walk-in customers—sell DIEHARD™ to insure the plants and provide more profits. It is easy for the garden center operator to direct the customer with “Oh, here you need X number of bags of this. We use it ourselves in our landscape projects.”
- If the garden center sells sod by the pallet they should be selling DIEHARD™ Pallet Pak Plus with every pallet. The customer will love the results and the garden center will make an ADDITIONAL \$12.50 per pallet of PROFIT !!!
- Grows hanging baskets - use DIEHARD™ to prevent “dry-outs” and reduce watering. Selling hanging baskets that require less maintenance is a “No Brainer”. Again, a happy customer – what a pleasure.
- As an “add-on” with landscape jobs - sell DIEHARD™, especially with guaranteed plants—Prime candidate for pre-measured 8 oz. DIEHARD™ Transplant and 3 lb. DIEHARD™ Flower Bed products.

Applications and Costs

Transplanting Trees & Shrubs - Recommend the PRE-MEASURED 8 OZ. DIEHARD™ Transplant amended into the planting hole in the upper 8-10 inches adjacent to the root ball.

COST - GENERALLY 2-3%, OR LESS, OF THE COST OF PLANT MATERIAL

Example: a \$275.00, 10' to 12' high, 2-inch caliper tree is treated for \$4.25.

Tree Spades - DIEHARD™ Transplant: Moisten the walls of the planting hole with water and broadcast DIEHARD™ Transplant evenly in the upper 8-10 inches of the planting hole.
COST - GENERALLY 2%, OR LESS, OF THE COST OF THE PLANTED TREE

Established Trees - DIEHARD™ Root Reviver: Mix 3 - 6 oz. with soil removed per hole (2" wide x 10" deep) on a 2.5 ft. grid.

COST - About \$30.00 to treat a 3" caliper tree with a 18 foot spread.

Annual Beds

- **DIEHARD™ Flower Bed:** Amend root zone of bed with DIEHARD™ Flower Bed at the rate of 3 lbs. per hundred square feet throughout the upper 3-4 inches of soil.
COST - 20 CENTS PER SQUARE FOOT – LASTS YEARS IN THE GROUND.
- **Horta-Sorb® MD:** If flower bed is subject to high heat and the soils do not hold enough water between irrigations use Horta-Sorb® MD at the rate of one pound per hundred square feet incorporated into the first 6-8 inches of bed.
COST - AMENDMENT, 5 CENTS PER SQUARE FOOT ROOT BALL DIP, ½ CENT PER PLANT

Organic Matter	Low
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*Nitrate forms of nitrogen are preferable to ammonium forms especially in peat mixes.

Response to mycorrhizal inoculation along with fertilization has often been positive even at normally recommended application rates (nutrient levels higher than those suggested above). However, mycorrhiza can be most beneficial at low fertility levels - increasing growth rate, plant quality, and survivability and at the same time reducing fertilizer material and labor costs.

As a general guideline for citrus, the University of California suggests applying 1/3 or less the recommended rates of ammonium nitrate and super phosphate.

Here's some further reading:

<http://aggie-orticulture.tamu.edu/faculty/davies/research/morgan.html>
<http://cropsoil.psu.edu/sylvia/mycorrhiza.htm>

Procedure to see if roots are mycorrhizal:

<http://invam.caf.wvu.edu/methods/mycorrhizae/mycorrindex.htm>

10. What differences are there between commercial suppliers available? There are presently a dozen, or more, suppliers of mycorrhizal products. The differences are typical of what one would expect. There are two or three with good products, four or five with "so-so" products and three or four with real "dogs". Our advice to you is to ASK THE SUPPLIER FOR REFERENCES. If they can't give you references that you can RELATE to, or that you've at least heard of, then that speaks volumes about the company. If they give you some homeowner in Portland, OR that used the product with tomatoes and got really good results - who really cares if you're and arborist

Several companies, both nursery and peat suppliers now market their products as “Contains Mycorrhizae”. Their statements DO NOT claim that colonization has happened and that the roots of the plants are mycorrhizal. I have quizzed these companies and found that they have not measured the degree to colonization that has taken place in the plants produced. Therefore, what is the point? Could they be making claims only to better sell their products without caring about the results? Unfortunately, I believe they are selling the “sizzle” instead of the steak.

So what must you change and understand so that you can get mycorrhizal roots? Understand a mycorrhizal inoculant can be introduced to the roots of a plant and never colonize because the fungi’s benefit to the root is being supplied by the management techniques of the grower. The fungi must play a roll if it is to earn foods from the roots. If the roots can get by “freeloading” everything from the grower it will not give the fungi the time of day let along foods. The big benefit that the fungus offers is phosphorus uptake. To give the fungi a chance to perform this vital roll back off of phosphorus applications and use an organic nitrogen source. This will give the fungi a roll and perhaps justify colonization to the plant.

To assure inoculation the University of California recommends that the nutrient levels should be below at least one of the following with the phosphorous level being the most critical:

Nitrogen* 50 ppm	(approx 95 lbs/ac = 105 kg/ha)
Phosphorous (Olsen) 34 ppm	(approx 64 lbs/ac = 71 kg/ha)
Manganese 27 ppm	(approx 50 lbs/ac = 55 kg/ha)
Zinc 12 ppm	(approx 23 lbs/ac = 25 kg/ha)

Seeding & Turf

Why *DIEHARD™* Is Necessary:

Turf applications of our products are categorized by virtue of how much money can reasonably be spent to manage the turf. Most turf applications can little afford the treatments available to assure success. Indeed, a cost of ½ cent per square foot for a large DOT, or prairie reestablishment job may be too high to be considered. On the other hand, turf establishment at a sports field, an entrance to a new development or high visibility area can support 5, or even 10 cents per square foot. Moreover, what about the cost available to “naturalize” a golf green. Twenty-five cents per square foot is not out of the question provided the benefits are there to support the cost.

Successful germination of seed and rooting of sprigs and sod are largely due to frequency of watering. Successful establishment of turf is highly contingent on the physiology of the soils and grass. Mycorrhizal roots enable establishment and long-term health. The use of *DIEHARD™* Turf contributes greatly by inoculating the roots, providing beneficial bacteria and “foods” for the soil. Horta-Sorb® MD contained in the product holds water in the root zone, offering better overall results **and** a more successful installation.

With seeding and sodding at 2 pounds 400 sq. ft. pallet will manage 10 gallons of water per hundred square feet in the first inch, or two, of soil where water is most critical. At this rate over 1,000 gallons of water is managed per acre. Imagine the impact managing water at this level has on root establishment for seeded, sprigged, or sodded areas.

Sales Tips

Conditions of Plant Stock:

- Sod is dried out (90% of roots absent) Poor vigor—use *DIEHARD™* Turf by broadcasting (prior to setting sod), to speed establishment and reduce watering.

Conditions at Planting Site:

- Water not available (turf on its own)
- Success questionable—use DIEHARD™ Turf to reduce watering and replanting.
- Irrigation not used (manual watering) –use Horta-Sorb™ MD or DIEHARD™ Turf to cut watering by 50%.
- High labor/equipment cost—use DIEHARD™ Turf to reduce labor and watering costs.
- Excessive drainage on slopes or disturbed ground (ground dries out fast)
- Replanting likely—insure with DIEHARD™ Turf to promote quicker establishment and reduce “dry-outs”.
- Remote location (long transit, high cost)
- Watering, replacement, high cost—use DIEHARD™ Turf to reduce labor, watering and reset costs.
- Time of year (summer heat, spring/fall winds)
- Fast dry out, replacements— DIEHARD™ Turf to reduce costs and transplant shock.

“Certain Sell” Clients:

- Wholesale landscape supply yards that sell sod by the pallet. – Enables them make an ADDITIONAL \$12.50 PER PALLET in PROFITS...DIEHARD™ Turf Pallet Pak
- Golf Course Architects -
- **BIG USERS on fairways, greens and landscaping.**
- **Money is no object to get results (quick establishment).**
- **Water holding capacity of turf areas critical during establishment—use DIEHARD™ Turf.**
- **Cannot water during tee times.**
- **Establishment time critical (high investment).**
- **Lushness important (pride) -- use DIEHARD™ Turf**
- **Very professional customer group (I have never met a superintendent that owned the course.).**
- Developers (Grand openings, entranceways).

spores and that makes it the best product on the market, when in fact the company’s products are weak at best and when compared to other products are not superior and usually inferior. Know whom you're dealing with. Ask for references.

Lastly, some strains such as *Glomus deserticola*, *Glomus microaggregatum*, *Glomus mosseae*, and sometime *Glomus intraradices* produce clusters of spores very (like a popcorn ball”. Most of time, *Glomus deserticola* and *Glomus microaggregatum* produce clusters with as many as 500 spores minimum stuck together. *Glomus mosseae* produce external sporocarps (5-10 spores inside) or external clusters of "young spores" and *Glomus dussii* produce external sporocarps (containing hundred of very small spores) and also external spores entrapped within the external mycelium. *Glomus intraradices* produce large quantity of INTERNAL spores inside the root (hundred spores /cm of root can be counted sometime). All these "natural occurring” sporulation configurations are considered for the counting spores.

Endomycorrhizae are not Ecto and this difference must be considered.

The most important aspect is the standardization of the product and the efficiency and quality.

8. If I am planting like type plants in an established setting, is the use of a mycorrhizae inoculant still necessary? Use of an inoculant here is still appropriate as research shows that the species of mycorrhizal fungi most effective with young plants may be different than the species most effective with mature plants of the same plant species.

9. I’m a grower. Can I use mycorrhiza in my production to produce a more natural plant? Yes, you can but you have to commit yourself to change.

species that is being planted. The introduction of diverse species at the time of planting greatly enhances the probability of successful colonization of the roots to take advantage of all of the benefits of mycorrhizal roots.

7. When buying an inoculant for mycorrhiza is the number of spores important? Yes, the number of spores can be important, but more important is the degree of infectivity present in an inoculant. How effective an inoculant is depends on how rapid it can cause colonization of the root system. Spores tend to be the least infective of fungal parts in the genus *Glomus* (which comprise the majority of commercially available inoculants). Hyphal fragments are most infective, followed by mycorrhizal root fragments. All three infective components are referred to as propagules by INVAM

(<http://invam.caf.wvu.edu/otherinfo/articles/propagules.htm>). Make sure that the species used in the inoculant are diverse and have been proven to be effective over wide ranges of plant species, pH, and soil types. ([DIEHARD™ species are proven - see a +40 page reference list.](#))

Consumers can be fooled by companies that claim high spore count but use weak, or ineffective spores, in the count that are easy to reproduce to achieve spore count specifications. Some spores too offer little potential for good colonization but the propagules of these species are the real potential partner to begin the colonization process. So, unfortunately, the answer to the question is both yes and no. The key here is to work with a company that has established itself in the market from top to bottom with high standards of products, customer service, and an honest effort to be a legitimate business partner with your company. Too often you can get sucked in with four-color advertising and fancy literature, but beyond the window dressing is a company out to take your money and give you junk - packaged in a pretty box!! It's a fact that one company claims its product consists only of

- **Establishment time important (high investment) -- use DIEHARD™ Turf to establish turf quicker.**
- **Lushness important—use DIEHARD™ Turf to insure quick establishment.**
- **Usually can provide good contacts with the local (or in-house) Landscape Architect.**
- State DOT, Parks Dept., General Services - **Spend huge amounts on watering contracts** - cut 50% with DIEHARD™ MD during installation - May not have budget \$'s available for watering (subsequent watering viewed as maintenance). Being able to manage water in the root zone is a big plus. If DIEHARD™ Turf's use is deemed too costly, suggest Horta-Sorb® MD at the rate of 3 lbs. per thousand square feet. (Cost less than a cent per sq. ft.)
- **Shoulder repairs very tough in certain places. Questionable resources available to do job correctly—use DIEHARD™ Turf to better manage labor and watering resources.**

Applications and Costs

Sodding - Broadcast DIEHARD™ Turf at 3/4 lbs. per hundred square feet. Work in the first 1-2 inches, lay sod, roll and water. (Includes Horta-Sorb® water management gel.)

COST -- 6 CENTS PER SQUARE FOOT

Alternatively,

Broadcast just Horta-Sorb® MD at the rate of 3 pounds per thousand square feet to manage just water.

COST – Less than a penny per square foot.

Seeding - Broadcast DIEHARD™ Turf at 3/4 lbs. per hundred square feet. Work in the first 1-2 inches, lay sod, roll and water. (Includes Horta-Sorb® water management gel.)

COST -- 6 CENTS PER SQUARE FOOT

Alternatively,

Broadcast just Horta-Sorb® MD at the rate of 3 pounds per thousand square feet to manage just water.

COST – Less than a penny per square foot.

Springing - Broadcast DIEHARD™ Turf at 3/4 lbs. per

hundred square feet. Work in the first 1-2 inches, lay sod, roll and water. (Includes Horta-Sorb® water management gel.)

COST -- 9 CENTS PER SQUARE FOOT

Alternatively,

Broadcast just Horta-Sorb® MD at the rate of 3 pounds per thousand square feet to manage just water.

COST – Less than a penny per square foot.

Hydromulching - Include DIEHARD™ HydroClaim™

into hydromulch tank at the rate of 10 pounds per acre.

COST -- 5 CENTS PER SQUARE FOOT

Alternatively,

Add Horta-Sorb® SM to tank at the rate of 50 pounds per acre before adding fertilizer. At a typical rate of 3,000 gallons of water per acre, 50 pounds of Horta-Sorb® SM will hold **1,500** gallons of this water on the surface of the ground where the seed is, and hence, promote much faster germination. Use with hydroseeding also recommended.

COST - ½ CENT PER SQUARE FOOT

Sod Plugs—Hydrate DIEHARD™ MD to full capacity (let stand 2 hours). Pour into each plug hole ½ cup of this hydrated gel before placing sod plugs into holes.

COST - ½ CENT PER SOD PLUG

A – FAQ's on Mycorrhizal Inoculants

1. What are mycorrhizae? Mycorrhizae are mutualistic relationships between soil fungus and plant roots. Scientist tells us that the relationship has been around for 400 million years although discovered in 1845 by a scientist in Germany.

2. Where can the introduction of mycorrhizal fungi with roots have the greatest effect? In disturbed soils, the kinds found in landscape projects, restoration, new grove/orchards, and mine reclamation sites.

3. Is there mycorrhizae in the plants that I buy at the nursery? Probably not. Even if there were a mycorrhizal fungi present in nursery stock the species that would thrive in a nursery setting would probably offer little benefit in a real world landscape, restoration, or forestry planting.

4. What about field grown plant materials - would they have beneficial mycorrhizal fungi associated with the roots? Again, practices generally are geared to high production to turn inventories. Under highly managed operations any mycorrhizal fungi present would be poorly adapted to “real world” conditions found at out planting sites.

5. Are multi-species mycorrhizal inoculants really necessary? Multiple species are very important because they increase the odds significantly that one of the selected species will prosper with the roots and multiply quickly.

6. Since mycorrhizal fungi may be present in the soil, anyway why should I inoculate my transplants? Although mycorrhizal fungi may be present, the types (species) may not be the most effective for the plant

Appendices

- A.....FAQ's On Mycorrhiza
- B.....Plant Species and Type of Mycorrhiza
- C.....Other Ingredients and Benefits
- D.....Product Comparisons

Landscape, Seeding & Turf Uses

Athletic Fields - *New Construction—Broadcast DIEHARD™ Turf at 88 lbs. per acre to develop quicker establishment using less water. Work in, seed, sprig, or sod, then roll and water.*

COST -- 1.8 TO 2.4 CENTS PER SQUARE FOOT

Cemeteries

Annual Beds - Amend root zone of bed with DIEHARD™ Flower Bed at the rate of 3 lbs. per thousand square feet. Bed should be amended 6" deep. Dip small transplants (1-2" root ball diameter) in a DIEHARD™ Root Dip gel mixed at a rate of 1 lb. to 25 to 40 gallons of water.

**COST - AMENDMENT, 25 CENTS PER SQUARE FOOT
ROOT BALL DIP, ½ CENT PER PLANT**

Garden Centers

Retail Division—The DIEHARD™ Transplant, 8 oz. bag should be placed at each check out location and actively sold with plant sales. The 3 lb. DIEHARD™ Flower Bed package should be sold with every bedding plants.. DIEHARD™ SC, seed coating ½ lb. bags to be sold with each 50 lb. bag of grass seed.

**COST—THE NORMAL MARK-UP ON THE DIEHARD™ IS OVER 100 PERCENT
THE NORMAL MARK-UP ON THE DIEHARD™ SC, SEEDCOATING, IS OVER 100 PERCENT.**

Landscape Division - Recommend the DIEHARD™ Transplant be used with all transplanting and that DIEHARD™ Turf be specified and used with turf jobs.

Golf Courses

Fairway Construction—Broadcast DIEHARD™ Turf at 88 lbs per acre to develop quicker establishment using less water. Work in, seed, sprig, or sod, then roll and water.

COST - 10 CENTS PER SQUARE FOOT

Greens Construction - DIEHARD™ Turf to a depth of six to eight inches using 2 pounds per hundred square feet. When using a soil blender, amend with DIEHARD™ Turf at a rate of 2 lbs per cubic yard for 6 inch depth and 3 lbs. per cubic yard for 8 inch depth.

COST - 10 CENTS PER SQUARE FOOT

Seeding And Overseeding - Mix ½-pound DIEHARD™ SC with each 50 pounds of seed.

COST - \$20.00 PER 100 POUNDS OF SEED

Trees—Recommend the PRE-MEASURED 8 OZ. DIEHARD™ Transplant.

COST—GENERALLY 1% OR LESS, OF THE COST OF PLANT MATERIAL

Example: a \$275.00, 12' to 15' tree is treated for about \$4.25.

Annual Beds - Amend root zone of bed with DIEHARD™ Flower Bed at the rate of 3 lbs. per thousand square feet amended 6" deep. Dip small transplants (1-2" root ball diameter) in a DIEHARD™ Root Dip gel mixed at a rate of 1 lb. to 25 to 40 gallons of water.

COST—AMENDMENT - 25 CENTS PER SQUARE FOOT.

ROOT BALL DIP, ½ CENT PER PLANT

Hydromulching

Add DIEHARD™ HydroClaim™ to tank at the rate of 10 pounds per acre before adding fertilizer. Product has tacking properties, humic acid, beneficial bacteria to boost germination and survival.

COST—400.00 per acre.

Landscape Architects

Ask the Landscape Architect to consider using DIEHARD™ with his clients' projects, as the responsibility for problems encountered in a landscape installation rests with them. Remember that the Landscape Architect has the responsibility of insuring that the latest improved management techniques be

Broadcast just Horta-Sorb® MD at the rate of 3 pounds per thousand square feet to manage just water.
COST – Less than a penny per square foot.

Seeding - Broadcast DIEHARD™ Turf at ¾ lbs. per hundred square feet. Work in the first 1-2 inches, lay sod, roll and water. (Includes Horta-Sorb® water management gel.)

COST -- 9 CENTS PER SQUARE FOOT

Alternatively,

Broadcast just Horta-Sorb® MD at the rate of 3 pounds per thousand square feet to manage just water.

COST – Less than a penny per square foot.

Sprigging - Broadcast DIEHARD™ Turf at ¾ lbs. per hundred square feet. Work in the first 1-2 inches, lay sod, roll and water. (Includes Horta-Sorb® water management gel.)

COST -- 9 CENTS PER SQUARE FOOT

Alternatively,

Broadcast just Horta-Sorb® MD at the rate of 3 pounds per thousand square feet to manage just water.

COST – Less than a penny per square foot.

Tree Movers—Spade

Trees planted with a tree spade are high cost materials. Although the amount of soil that is moved with the tree can weigh as much as 6,000 lbs. (with an 88" spade) the actual amount of roots, which are attached to the tree is generally thought to be about 20 to 25 percent of the total of the root system. With such a small amount of the roots intact, and such a high dollar cost of the spaded tree, the use of DIEHARD™ Transplant during installation is simply good management.

Application—Moisten the walls of the planting hole with water and broadcast DIEHARD™ Transplant evenly throughout the planting pit at the recommended rate.

COST - GENERALLY 1%, OR LESS, OF THE COST OF PLANT MATERIAL

COST—GENERALLY 1%, OR LESS, OF THE COST OF PLANT MATERIAL

Example: a \$275.00, 12' to 15' tree is treated for about \$4.25.

Tree Spades - Moisten the walls of the planting hole with water and broadcast DIEHARD™ Transplant evenly throughout the planting pit at the recommended rate.

COST—GENERALLY 1%, OR LESS, OF THE COST OF THE PLANTED TREE.

School Maintenance Departments

This customer generally has tight budget constraints and a constantly changing political environment that generally dictates “more trees, flowerbeds, etc.”, but typically with little, or no additional funds to maintain these new plantings. (Funds that are allocated for new plantings are considered capital expenditures as compared to maintenance funds that are appropriated annually.)

Trees - Recommend the PRE-MEASURED 8 OZ. DIEHARD™ Transplant.

COST—GENERALLY 1%, OR LESS, OF THE COST OF PLANT MATERIAL

Example: a \$275.00, 12' to 15' tree is treated for about \$4.25.

Annual Beds—Amend root zone of bed with DIEHARD™ Flower Bed at the rate of 3 lbs. per hundred square feet 6” deep. Dip small transplants (1-2” root ball diameter) in a DIEHARD™ Root gel mixed at a rate of 1 lb. to 25 to 40 gallons of water.

COST—AMENDMENT, 25 CENTS PER SQUARE FOOT ROOT BALL DIP, ½ CENT PER PLANT

Sodding - Broadcast DIEHARD™ Turf at 2 lbs. per hundred square feet. Work in the first 1-2 inches, lay sod, roll and water. (Includes Horta-Sorb® water management gel.)

COST -- 9 CENTS PER SQUARE FOOT

Alternatively,

used on his clients’ projects.

COST- GENERALLY 2%, OR LESS, OF THE COST OF THE PROJECT

Landscapers

The landscape industry loses hundreds of millions of dollars each year caused by inadequate water management in the root zone of transplanted materials. This cost, referred to as “reset costs” are included in the bid process as a typical cost of all installations. The use of DIEHARD™ during installations significantly reduces these costs. It should be pointed out to the landscaper that just because he makes provisions for reset costs in his bids doesn’t mean that, as a businessman, he shouldn’t do all that is economically possible to reduce these costs.

COST ARE GENERALLY 2 %, OR LESS, OF THE COST OF THE PROJECT.

Park Departments

This customer must constantly deal with the changing political environment that generally dictates “more trees, flowerbeds, etc.”, but typically with little, or no additional funds to maintain these new plantings. (Funds that are allocated for new plantings frequently are not accompanied with funds to maintain these new plantings.)

Trees - Recommend the PRE-MEASURED 8 OZ. DIEHARD™ Transplant.

COST—GENERALLY 1%, OR LESS, OF THE COST OF PLANT MATERIAL

Example: a \$275.00, 12' to 15' tree is treated for about \$4.25.

Tree Spades - Moisten the walls of the planting hole with water and broadcast DIEHARD™ Transplant evenly throughout the planting pit at the recommended rate.

COST—GENERALLY 1%, OR LESS, OF THE COST OF

THE PLANTED TREE.

Annual Beds—Amend root zone of bed with DIEHARD™ Flower Bed at the rate of 3 lbs. per hundred square feet 6” deep. Dip small transplants (1-2” root ball diameter) in a DIEHARD™ Root gel mixed at a rate of 1 lb. to 25 to 40 gallons of water.

**COST—AMENDMENT, 25 CENTS PER SQUARE FOOT
ROOT BALL DIP, ½ CENT PER PLANT**

Sodding - Broadcast DIEHARD™ Turf at 2 lbs. per hundred square feet. Work in the first 1-2 inches, lay sod, roll and water. (Includes Horta-Sorb® water management gel.)

COST -- 9 CENTS PER SQUARE FOOT

Alternatively,

Broadcast just Horta-Sorb® MD at the rate of 3 pounds per thousand square feet to manage just water.

COST – Less than a penny per square foot.

Seeding - Broadcast DIEHARD™ Turf at 2 lbs. per hundred square feet. Work in the first 1-2 inches, lay sod, roll and water. (Includes Horta-Sorb® water management gel.)

COST -- 9 CENTS PER SQUARE FOOT

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Broadcast just Horta-Sorb® MD at the rate of 3 pounds per thousand square feet to manage just water.

COST – Less than a penny per square foot.

Sprigging - Broadcast DIEHARD™ Turf at 2 lbs. per hundred square feet. Work in the first 1-2 inches, lay sod, roll and water. (Includes Horta-Sorb® water management gel.)

COST -- 9 CENTS PER SQUARE FOOT

Alternatively,

Broadcast just Horta-Sorb® MD at the rate of 3 pounds per thousand square feet to manage just water.

COST – Less than a penny per square foot.

Hydromulching - Include DIEHARD™ Tackifier into hydromulch tank at the rate of 10 pounds per acre.

COST -- \$120.00 per acre

Alternatively,

Add Horta-Sorb® SM to tank at the rate of 50 pounds per acre before adding fertilizer. At a typical rate of 3,000 gallons of water per acre, 50 pounds of Horta-Sorb® SM will hold **1,500** gallons of this water on the surface of the ground where the seed is, and hence, promote much faster germination. Use with hydroseeding also recommended.

COST - ½ CENT PER SQUARE FOOT

Road Departments

This customer generally subcontracts landscape and vegetation plantings. Included in the costs of all projects that they administer are labor, watering costs and reset costs (guarantees by the contractor). The use of DIEHARD™ will significantly reduce these costs and provide a faster established landscape.

New Construction—Broadcast DIEHARD™ MD at 3 pounds per thousand square feet. Work in, seed, sprig, or sod, then roll and water.

COST -- 1.5 CENTS PER SQUARE FOOT

Hydromulching - Include DIEHARD™ Tackifier into hydromulch tank at the rate of 10 pounds per acre.

COST -- \$120.00 per acre

Alternatively,

Add Horta-Sorb® SM to tank at the rate of 50 pounds per acre before adding fertilizer. At a typical rate of 3,000 gallons of water per acre, 50 pounds of Horta-Sorb® SM will hold **1,500** gallons of this water on the surface of the ground where the seed is, and hence, promote much faster germination. Use with hydroseeding also recommended.

COST - ½ CENT PER SQUARE FOOT

Trees - Recommend the PRE-MEASURED 8 OZ. DIEHARD™ Transplant.