



The Root of All Good™

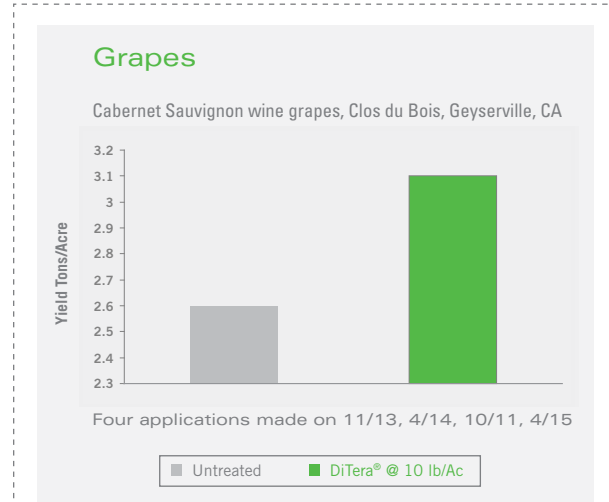


DiTera® Biological Nematicide

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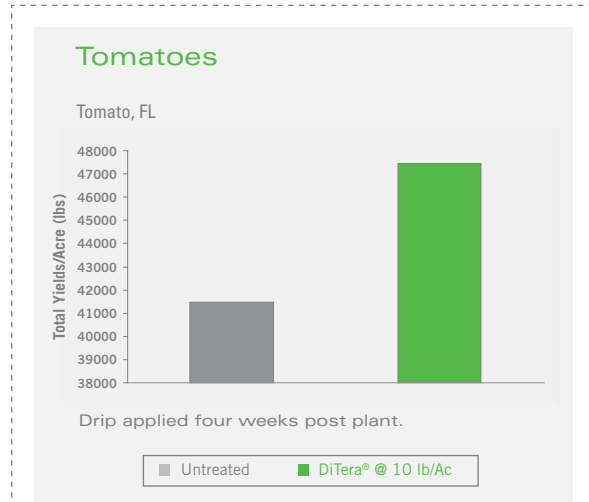
Increased Yields and Return on Investment (ROI)

Some representative field trials demonstrating yield enhancement with DiTera® Biological Nematicide:



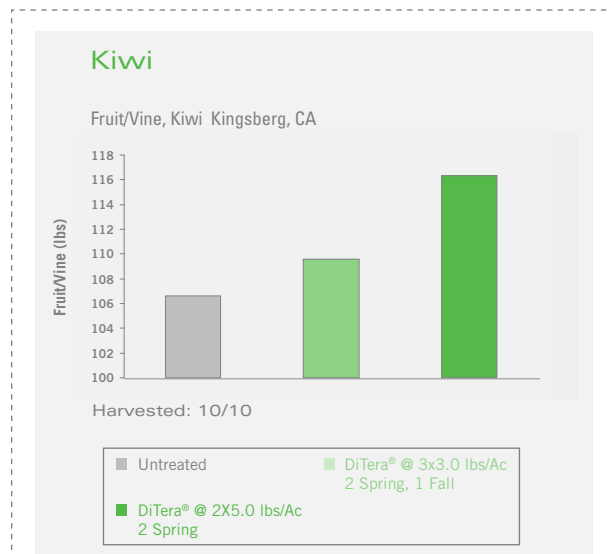
ROI

Yearly DiTera® cost: \$300/Ac.
 Additional revenue generated: \$1,000/Ac.
 DiTera® ROI: 3:1



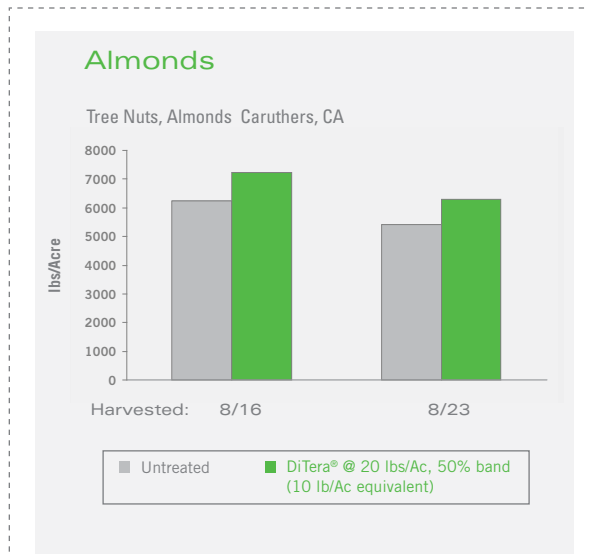
ROI

Yearly DiTera® cost: \$300/Ac.
 Additional revenue generated: \$2,400/Ac.
 DiTera® ROI: 8:1



ROI

Yearly DiTera® cost: \$150/Ac. (3 x 3.0 lb)
 Additional revenue generated: \$3,000/Ac.
 DiTera® ROI: 20:1



ROI

Yearly DiTera® cost: \$300/Ac.
 Additional revenue generated: \$2,300/Ac.
 DiTera® ROI: 7:1

Plant Health Effects

DiTera® Biological Nematicide provides significant plant health effects leading to more vigorous and higher yielding crops.

- Increases plant shoot and root weights
- Reduces damaging effects of nematodes to root systems
 - ◇ Roots are more efficient, providing greater plant vigor
 - ◇ Enhances nutrient uptake
- Enhances plant foliage, visual greening effect

Healthier roots, better yields



Root systems from pepper plants treated with DiTera® (left) and a standard nematicide (right). The DiTera® treated plots boosted yield nearly 1000 crates/ha over that of the grower standard.

Healthier, lusher plants



Untreated



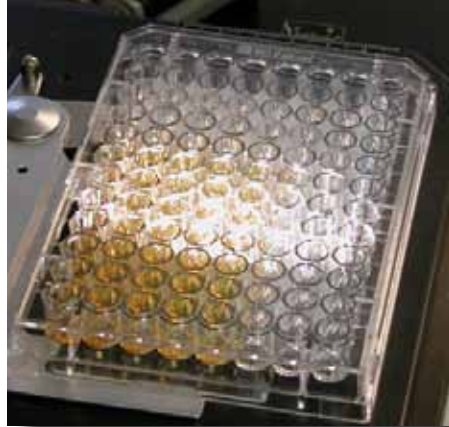
DiTera® treated

This illustrates the plant benefits of DiTera® on okra.

Product Description

DiTera® is:

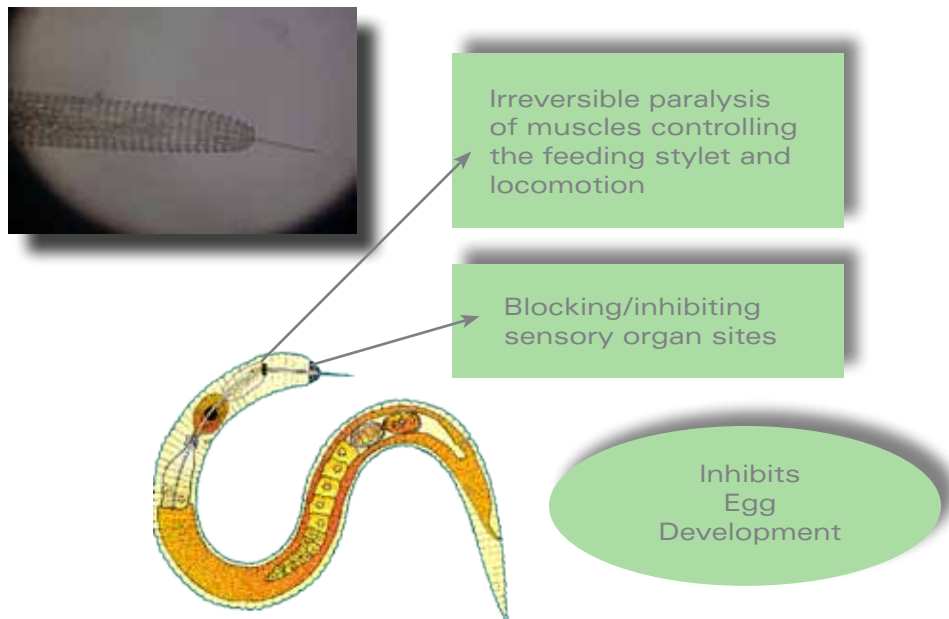
- Derived from the fermentation solids and solubles of the naturally occurring fungus *Myrothecium verrucaria*
- Formulated as a dry flowable (DF)
 - ◇ Low dust
 - ◇ Easy suspension
- Packaged in 10-pound (5 kg) bags
- Bioassayed for nematode activity before packaging
- Compatible with most chemical inputs
- Applied via drip irrigation
- Applied in-season with **positive** plant root health and growth effects
- Proprietary to Valent BioSciences Corporation



Nematicide Mode of Action

DiTera® has laboratory-demonstrated, scientifically-validated physiological effects on pest nematodes, resulting in excellent plant protection:

- Kills adult and juvenile plant-parasitic nematodes on contact by affecting the nematode nervous system
- Causes nematode muscular paralysis that permanently inhibits feeding and locomotion
- Disrupts sensory organs causing disorientation of juvenile nematodes preventing them from locating and feeding on plant roots
- Prevents development of eggs of some species, reducing the nematode population of subsequent generations



Vigorous and healthy growing plant roots are an excellent food source for nematodes. If left unchecked, nematode populations will rapidly increase.

- DiTera® suppresses nematode populations compared to untreated controls under vigorous plant growth conditions.
- Due to an increased amount of healthy roots in DiTera®-treated plants, typical soil counts for nematodes may not show a population decrease.
 - ◇ However, more efficient (less galled) plant roots providing improved plant health will reliably occur using DiTera®.

Soil nematode populations naturally change dramatically due to:

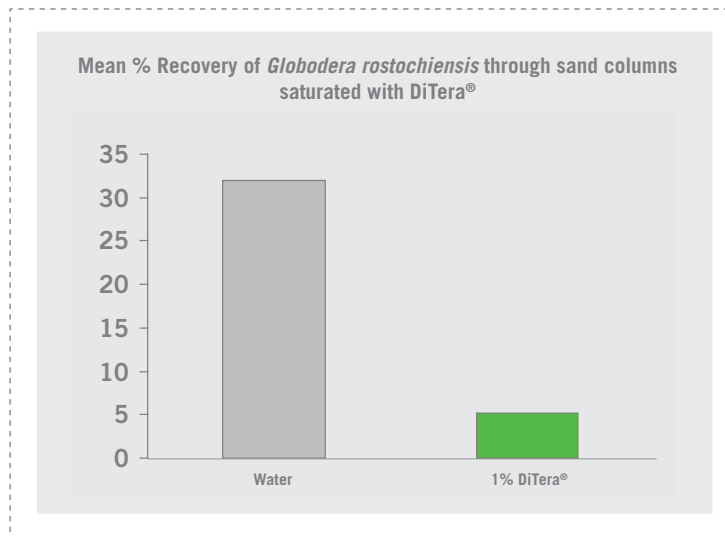
- Soil moisture and temperature
- Amount of new plant root growth
- Amount and source of irrigation water
- Nematode movement about the localized soil profiles

DiTera® inhibits nematode feeding through paralysis of the feeding stylet.

Treatment (Exposure Time)	1.0 Minutes (thrusts/minute)	3.0 Minutes (thrusts/minute)	5.0 Minutes (thrusts/minute)
Check	39.0	40.8	36.6
1% DiTera® (1.0 h)	13.0	21.6	14.0

DiTera® Biological Nematicide inhibits feeding by incapacitating the nematode stylet. The lower the number of stylet thrusts, the less the feeding capability. The stylet is used to penetrate plant roots causing plant damage.

DiTera® inhibits nematode movement.



Lower recovery means lower nematode movement and decreased capacity to move to roots.

DiTera® inhibits the ability of nematodes to locate roots.

Nematodes locate roots through responding to root chemical exudates. DiTera® disrupts this ability as this electrophysiological study on *Globodera* shows:

Test Fraction	Electrophysiological response to potato exudates (spikes/sec.)	% reduction in physiological response
Control	0.75	—
DiTera® (1%)	0.09	88%

Spectrum of Activity

Meloidogyne spp. (root knot nematodes)

Heterodera spp. (cyst nematode)

Globodera spp. (cyst nematode)

Pratylenchus spp. (lesion nematodes)

Tylenchulus semipenetrans (citrus nematode)

Longidorus spp. (needle nematodes)

Paratylenchus spp. (pin nematodes)

Rotylenchulus spp. (reniform nematodes)

Xiphinema spp. (dagger nematodes)

Belonolaimus spp. (sting nematodes)

Criconemoides spp. (ring nematodes)

Criconemella spp. (ring nematodes)

Tylenchorhynchus spp. (stunt nematodes)

Hoplolaimus spp. (lance nematodes)

Rotylenchus spp. (spiral nematodes)

Heliocotylenchus spp. (spiral nematodes)

Radopholus spp. (burrowing nematodes)



Globodera restochiensis spp.
(Ulrich Zunke, University of Hamburg, Bugwood.org)



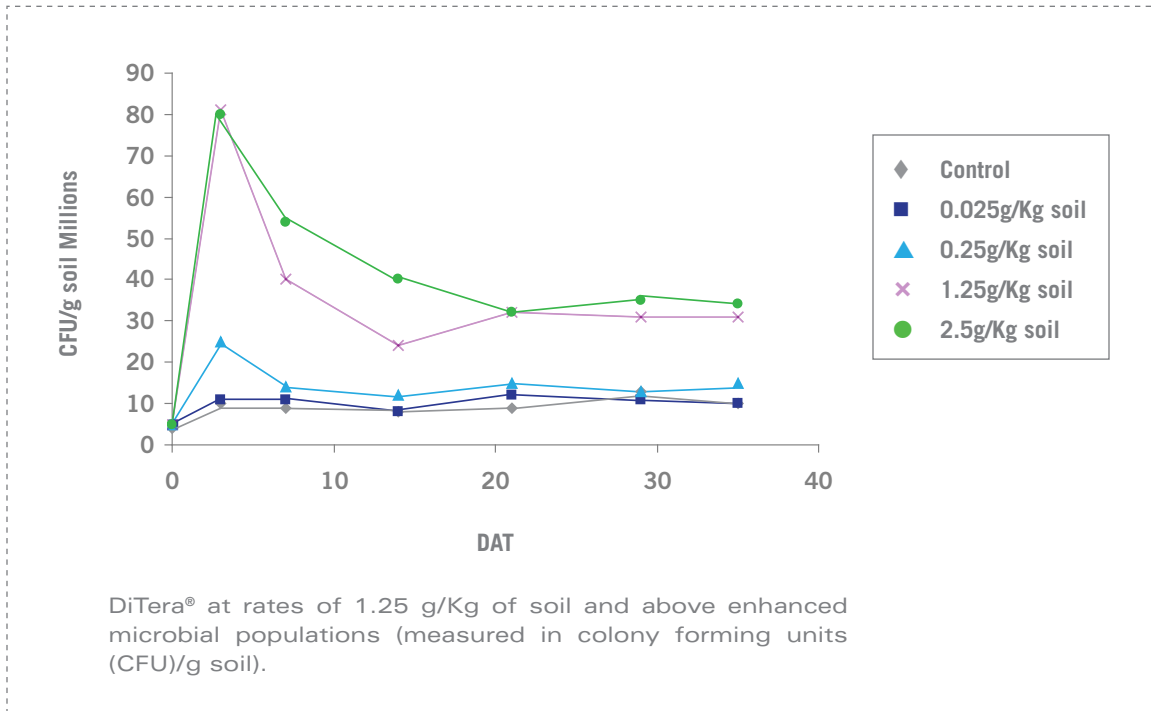
Meloidogyne incognita spp.
(Photo by William Wergin)



Radopholus similis spp.
(Photo by Michael A. McClure)

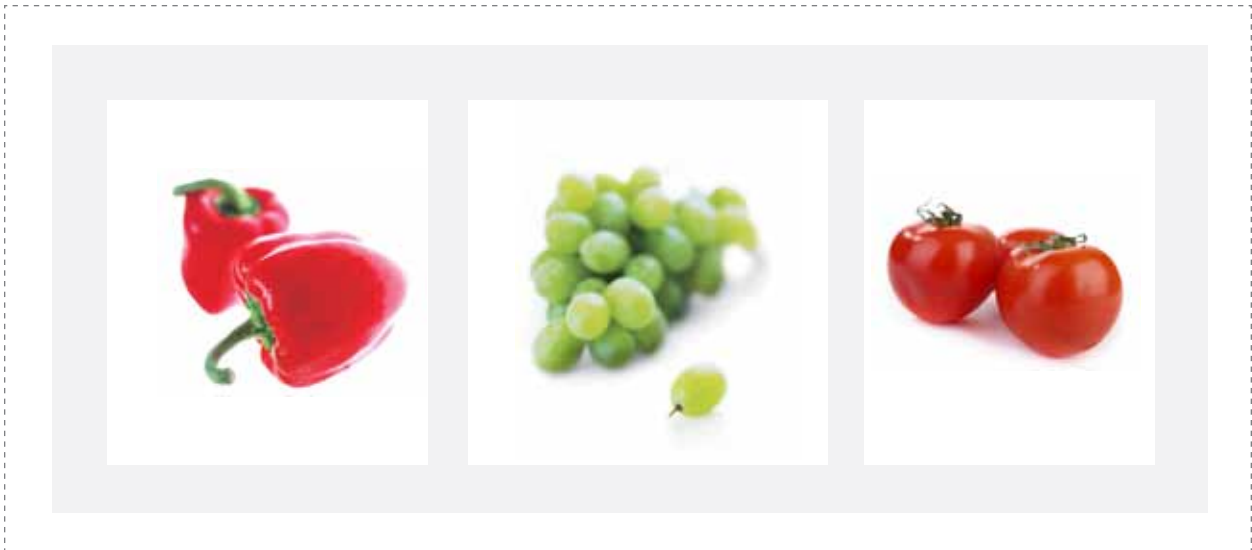
Soil Enhancement Effects

DiTera® stimulates growth of the beneficial organisms in the root rhizosphere increasing root health and plant nutrient availability.



DiTera® also enhances water holding capacity. This laboratory study shows that addition of DiTera® at 0.5 g/pot increased the water holding capacity by 40%. The surfactant Tween™ 20 had no effect.

TRT	Weight (g)/Pot (Before Watering)	Weight (g)/Pot (After Watering)	Weight of Not Drained Water in Pot (g)
UTC	156.7	177.2	20.8
Tween™ 20 at 0.05%	158.5	178.7	21.8
DiTera® at 0.5g/Pot	158.8	188	29.2



Labeled Crops

Perennial Nut and Fruit Crops

Citrus (orange, lemon, grapefruit)
 Tree nuts (almond, pecan, walnut)
 Kiwi
 Pome Fruit (apple, pear)
 Stone Fruit (peach, plum, prune)
 Avocado
 Pomegranate

Berries

Blackberry
 Raspberry
 Blueberry

Grape (table and wine)

Field Crops

Cotton
 Soybean
 Sugarcane
 Peanut
 Tobacco

Tropical perennial crops

Banana
 Cacao bean
 Mango
 Globe papaya
 Pawpaw
 Persimmon
 Plantain

Leafy Vegetables and Cole crops

Cucumber
 Melon
 Squash
 Eggplant
 Pepper
 Tomato
 Celery
 Head and leaf lettuce
 Spinach
 Broccoli
 Cabbage

Ornamentals, Transplants

Ferns
 Hosta
 Bedding plants
 Tulips
 Tobacco for transplant

Turf

Spices

Ginseng
 Basil
 Black pepper
 Chive
 Celery seed
 Dill seed

Best Rates and Practices

Annuals

Number of applications: 4

Interval: 10-15 days

Application Rate: see drip irrigation application chart

Timing: Start at plant or first irrigation and continue through 1/2 to 2/3 of crop cycle

Perennials

Number of applications: 3

Interval: 10-15 days

Application Rate: see drip irrigation application chart

Timing: Two applications in spring at time of main root flush. One application in fall.

Notes:

DiTera® should be applied through drip irrigation. Sufficient water needs to be used to move the product into the root zone and maintain it there. Optimal activity can be expected when the soil is near moisture capacity and at the end of the irrigation cycle.

Multiple in-season DiTera® applications are encouraged to gain maximum plant health benefits while suppressing nematodes.

Drip Irrigation Application Chart

Band Width Inches	Pounds of DiTera® per 1,000 Feet of Row (= 15 lb/Ac. Broadcast)
12	0.36
18	0.54
24	0.73
30	0.91
36	1.08
48	1.45
60	2.00



Drip Irrigation

Drip irrigation is an optimal DiTera® application method. This method releases DiTera® at a constant rate directly to the plant base keeping the active material around the root mass where it can enhance root health and suppress nematode populations.

Resistance Management

Nematode populations may be as high as thousands of individuals per 2 ounces of soil. Female nematodes are highly productive egg layers and some do not require mating, as in the case of the female root knot nematode, which can lay 200-500 eggs during her life. These high populations and rapid development can lead to nematicide resistance.

- Contaminated irrigation water can be a ongoing source of resistant nematode populations.
- Most of the major nematicides belong to one of two classes of neurotoxin chemistry: organophosphates or carbamates.
 - ◇ This includes heavily used products like Mocap®, NemaCur®, Rugby®, Furadan®, Vydate® and Temik®.
- DiTera® has several different modes of action and will work against nematode populations that have demonstrated resistance or reduced susceptibility to standard nematicidal products.
 - ◇ DiTera® is easy to incorporate into your existing program.



Globodera restochiensis spp.
(Ulrich Zunke, University of Hamburg, Bugwood.org)



Radopholus similis spp.
(Division of Plant Industry Archive, Florida Department of
Agriculture and Consumer Services, Bugwood.org)



Globodera restochiensis spp.
(Ulrich Zunke, University of Hamburg, Bugwood.org)

Safety Profile

DiTera® advantages

- Minimum re-entry interval of only 4 hours
- Non-restricted usage means more flexibility than other nematicides
- Highly specific for pest nematodes; only affects plant-parasitic nematodes, not beneficial nematodes
- Low toxicology profile, Category IV
- No preharvest interval allowing you to use it up to time of harvest
- Excellent environmental profile: low toxicity for birds, fish, insects, earthworms
- DiTera® can be used around schools, waterways, public buildings, etc.
- Organic registration

DiTera® safety characteristics compared to nematicidal standards:

Product	REI hours	PHI days	LD50 - Oral Rat (mg/kg)	Label Signal Word
DiTera®	4	0	>5000	Caution
Nemacur® 3	48	72	10	Danger
Furadan®	48	14	11	Danger
Vydate®	48	14	9	Danger
Mocap® 20G	48-72	90	61	Danger
Temik® 15G	48	90	1	Danger
Telone® II	120	120	1	Danger



DiTera® provides you with a safe and effective alternative to the highly toxic nematicides currently on the market. DiTera® offers scientifically-proven, broad-spectrum nematode control and unique plant-health benefits resulting in vigorous, high yielding crops and an excellent return on your investment.

Organic Agency Listings

National Organic Program



National Organic Seal



FOR ORGANIC PRODUCTION

Organic Material Review Institute



Benefits Summary

- Outstanding grower return on investment
- Provides significant plant health benefits resulting in higher yield
 - Increased root vigor
 - Increased shoot vigor
 - Enhanced foliage color
 - Enhanced nutrient uptake by roots
- Broad-range nematicide with activity against numerous species including root knot and cyst nematodes
- Multiple modes of action for enhanced efficacy and nematicide resistance management
 - Nematode muscular paralysis inhibiting feeding and movement
 - Block of sensory organs preventing location and feeding on plant roots
 - Inhibition of egg development
- Soil Enhancement
 - Increases beneficial microbe populations
 - Improves soil water-holding capacities
- Harvest and application flexibility
 - Excellent worker safety profile
 - Excellent environmental profile
 - No use restrictions: in-season applications allowed
 - No residue issues giving harvest management flexibility
 - Can be used alone or part of a season-long nematicide-treatment program
- Resistance management
 - Alternative mode of action to commercial nematicides
 - Use as rotation partner with standard nematicides
 - Excellent tool for control of nematode populations suspected to be resistant to standard nematicides
- OMRI listed and USDA National Organic Program certified

VBC – WHO WE ARE

Valent BioSciences Corporation, an agricultural science and technology company, brings the power of biotechnology and biorational products to solve problems and to create value for our customers around the world. These products include environmentally compatible bioinsecticides, microbials and plant growth regulators that are naturally occurring or chemically derived and are used in a manner that is sustainable for both the environment and the industry. Our customers and industry peers consider our technology assessment, formulation expertise, development experience, product quality and market positioning as “best-in-class”.

CREATING VALUE THROUGH TECHNOLOGY AND PEOPLE™



ISO 9001:2008 Certified



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