January 2018

Introduction

Tekken™ Broad Spectrum Fungicide is a fungicide formulated from two active ingredients, isofetamid and tebuconazole. The different modes of action of the two active ingredients provide broad-spectrum disease control while helping manage resistance. The patent-pending formulation of Tekken delivers increased turf quality and reduced phytotoxicity and thinning of creeping bentgrass compared to stand-alone DMI applications. Applied at one rate for all uses, Tekken controls 21 diseases in golf course turfgrasses for up to 28 days.

General Information

TEKKEN FEATURES

- SDHI (Succinate dehydrogenase inhibitor) + DMI (Demethylation inhibitor) fungicide combination
- Two active ingredients = isofetamid + tebuconazole
- Dual modes of action
- Can be used any time during the year
- One convenient rate on all turfgrass uses at any height
- FRAC group 7+3

TURF SPECIES INCLUDE:

- Bermudagrass (common or hybrid)
- Zoysiagrass
- Kentucky bluegrass
- Fine and tall fescues
- Perennial ryegrass
- Bentgrasses (including creeping, common, velvet)

TEKKEN BENEFITS

- Use of multiple MOA's target pathogens at more than one site
- Excellent control of 21 listed diseases, including dollar spot, brown patch, and anthracnose
- Broad-spectrum control of ascomycetes and basidiomycetes fungi
- Provides disease control for 14-28 days
- Single rate for all listed diseases eliminates guesswork
- Excellent control of summer stress diseases
- Outstanding control for spring and fall cleanup

TEKKEN MODE OF ACTION

Tekken features dual modes of action. Both active ingredients are acropetal penetrants, entering and moving up through the xylem.

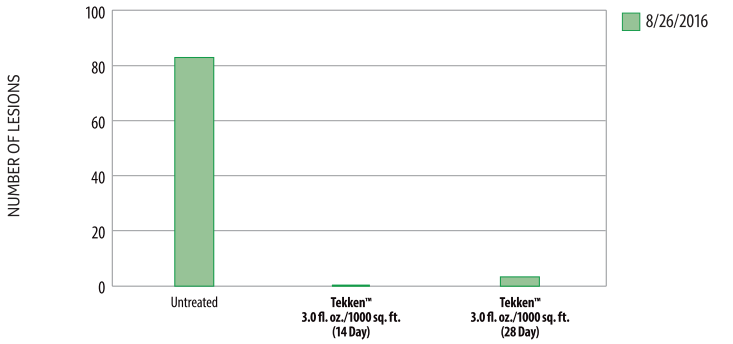
DISEASES CONTROLLED

- Dollar spot – *(Sclerotinia homoeocarpa)*
- Copper spot – *(Gloeocercospora sorghi)*
- Powdery Mildew - *(Blumeria graminis)*
- Rusts – *(Puccinia graminis, Puccinia coronata)*
- Red thread – *(Laetisaria fuciformis)*
- Pink patch – *(Liminomyces roseipellis)*
- Brown ring patch, Waitea patch – *(Waitea circinata var. circinata)*
- Brown patch, Large patch, Zoysia patch – *(Rhizoctonia solani)*
- Anthracnose – (*Colletotrichum cereale)*
- Bermudagrass decline, Take-all root rot – *(Gaeumannomyces graminis var. graminis)*
- Take-all patch – *(Gaeumannomyces graminis var. avenae)*
- Summer patch – *(Magnaporthe poae)*
- Gray leaf spot – *(Pyriculana grisea)*
- Stripe smut – *(Ustilago striiformis)*
- Spring dead spot – *(Leptosphaeria korrae, Leptosphaeria narmari, Ophiosphaerella herpotricha, Gaeumannomyces graminis)*
- Necrotic ring spot – *(Leptosphaeria korrae)*
- Fusarium patch – *(Fusarium roseum)*
- Gray snow mold, Typhula blight – *(Typhula incarnate, Tyhpula ishikariensis)*
- Pink snow mold, Microdochium patch *(Microdochium nivale)*
- Fairy ring – *(Various basisiomycetes)*
- Cool season brown patch, Yellow patch – *(Rhizoctonia cerealis)*

Performance Data

Evaluating Isofetamid + Tebuconazole Premixes and Application Intervals for Dollar Spot Control on Creeping Bentgrass Greens

University of Missouri



Application began May 6, 2016 and followed 14- or 28-day schedules. Evaluation date Aug. 26, 2016.

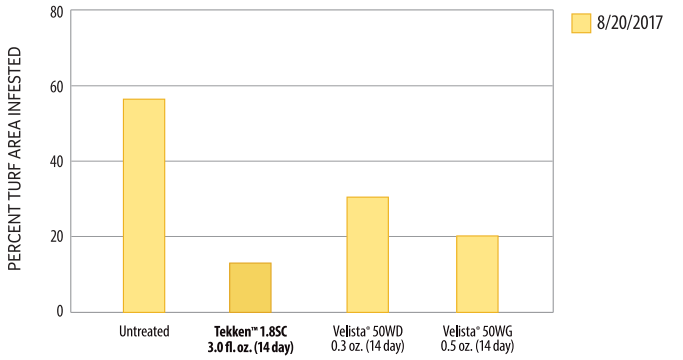
DOLLAR SPOT EVALUATION

Untreated

Treated with Tekken™ – 28-day interval

Anthracnose Control on Annual Bluegrass Putting Green

Rutgers University



Application began May 19, 2017 and followed a 14-day schedule. Evaluation date Aug. 20, 2016.

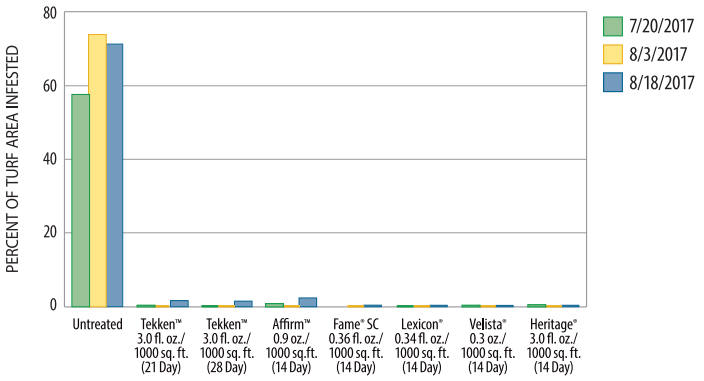
ANTHRACNOSE EVALUATION

Untreated

Treated with Tekken™ – 14-day interval

Brown Patch on Creeping Bentgrass Putting Green

University of Maryland



Application began May 19, 2017 and followed 14-, 21-, or 28-day schedules. Evaluation dates July 20, Aug. 3, and Aug. 18 2016

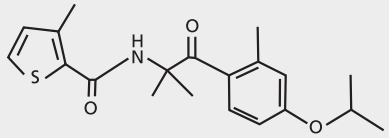
BROWN PATCH EVALUATION

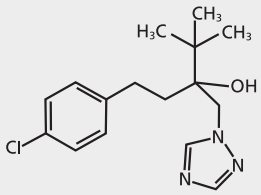
Untreated

Treated with Tekken™ – 28-day interval

Physical and Chemical Properties

Tekken Fungicide – Code Names Tested: EH714 Fungicide

Chemical Name (CAS):	Isofetamid
Chemical Name: (IUPAC)	*N*-[1,1-dimethyl-2-(4-isopropoxy -*o*-tolyl)-2-oxoethyl]-3 -methylthiophene-2-carboxamide
CAS number:	875915-78-9
Chemical Formula:	
Chemical Family:	Amide
Empirical Formula:	$C_20H_{25}NO_3S$
Molecular Weight:	359.484 g/mol
Odor:	Mild
Flamability:	Not applicable
Explosive Properties:	Not applicable
Disassociation Constant:	Does not disassociate
Octanol/Water Coefficient at pH = 7:	3.16 X 10^2
Water Solubility (20°C):	5.33 mg/liter
Vapor Pressure (25°C, mPa):	4.2 X 10^{-4}
Partition Co-Efficient (Log P, pH =7):	2.5
Aqueous Hydrolysis:	Stable at all environmentally relevent pH levels

Chemical Name (CAS):	Tebuconazole
Chemical Name: (IUPAC)	(RS)-1-p-chlorophenyl-4,4-dimethyl-3-(1H-1,2,4-triazol-1-ylmethyl) pentan-3-ol
CAS number:	107534-96-3
Chemical Formula:	
Chemical Family:	Triazole
Empirical Formula:	$C_{16}H_{22}ClN_3O$
Molecular Weight:	307.822 g/mol
Odor:	Mild
Flamability:	Not applicable
Explosive Properties:	Not applicable
Disassociation Constant:	5.0
Octanol/Water Coefficient at pH = 7:	5.01 X 10^3
Water Solubility (20°C):	36 mg/liter
Vapor Pressure (25°C, mPa):	1.3 X 10^{-3}
Partition Co-Efficient (Log P, pH =7):	3.7
Aqueous Hydrolysis:	Stable at at pH 5 – 9

SELECTED MAMMALIAN TOXICOLOGICAL ENDPOINTS FOR TEKKEN

Study	Results
Acute oral, rat	LD50 = 5,000 mg/kg of body weight
Acute dermal	LD50 > 5,000 mg/kg of body weight
Acute inhalation	LC50 > 2.11 mg/L
Eye irritation	Minimally irritating
Skin irritation	Slightly irritating
Skin sensitization (LLNA method)	Non-irritating

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