

**NOTE:** THE FOLLOWING INFORMATION IS OFFERED AS A GUIDE FOR PROSPECTIVE CHALLENGES TO MANAGING SEASHORE PASPALUM. ALL TURFGRASSES ARE SUBJECTED TO INSECT, DISEASE, AND WEED PRESSURES. PROPER MANAGEMENT IS THE KEY TO SUCCESS. YOU MUST CHECK ALL LABELS OF THE PESTICIDES TO BE USED ON THIS GRASS FOR LEGAL AND PROPER USE. MENTION OF A PARTICULAR PRODUCT IS NOT AN ENDORSEMENT OF THAT PRODUCT BUT REFLECTS WHAT IS KNOWN AT THE PRESENT TIME. ENVIRONMENTAL INTERACTIONS, INCLUDING SALINITY THAT IMPACT SPECIFIC SITES, MAY GIVE VARIABLE RESULTS IN THE USE OF SOME PRODUCTS.

## **RHIZOCTONIA DISEASES**

### **BROWN PATCH**

### **LARGE PATCH**

### **BROWN RING PATCH OR WAITEA REDDISH BROWN PATCH**

### **YELLOW PATCH**

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## **PATCH DISEASES**

### **Brown patch**

*(Rhizoctonia solani AG-2-2 III B and AG-1)*

**Symptoms:** prevalent in the Spring and Fall when temperatures range between 73-90°F and night temperatures drop below 68°F. Fungus generally stops at 90°F. Circular pattern of yellow grass with grayish colored smoke ring at the perimeter of the disease halo. Leaves pull loose very easily

since the pathogen destroys the tissue at the base of the leaf sheath. Starts as small circular patches of water-soaked shoots that wilt and turn light brown. Stolons remain green. New green leaves may emerge in the center of the diseased area. Irregularly shaped blotches on leaf blades—no distinct pattern; dark brown margins with white centers in the blotch area.

**Cultural control:** \*\*\*Avoid high nitrogen levels with high moisture conditions

\*\*\*Irrigate early in the morning to remove dew and allow rapid drying of the grass

\*\*\*Remove grass clippings during periods of disease activity

Reference: J.C, Fecg and L.J. Giesler. April 2013. The Brown Patch Blues. Superintendent 4(13):50-53.

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## Large Patch

*(Rhizoctonia solani AG-2-2 LP)*

**Symptoms:** initially starts as 2-3 inch diameter patches that rapidly develops into 200-300 in diameter patches. Color is light brown with reddish-brown fringe. Develops at air temperatures around 68°F (20°C). Poor soil drainage promotes the disease. Symptoms disappear when temperatures are above 82°F (28°C). Fungal mycelium increase at 50-59°F (10-15°C) and optimum growth of the pathogen is 77-82°F (25-28°C).

**Cultural control:** Avoid verticutting during infection period

Minimize duration of leaf surface wetness

Install drainage in poorly drained soils

Minimize nitrogen fertility applications

## **Suggested Fungicides: (ROTATE MODE-OF-ACTION CHEMISTRIES)**

**azoxystrobin (Heritage)\*\*\* Heritage Action (acibenzolar-s-methyl for stress tolerance inducement)**

**trifloxystrobin (Compass)\*\*\***

**fluoxastrobin (Disarm, Evito, Fame)\*\*\***

**fluoxastrobin + chlorothalonil (Disarm C and M, Fame + C)**

**fluoxastrobin + tebuconazole (Fame + T)**

**fluxapyroxad + pyraclostrobin (Lexicon)**

**fluazinam (Secure)**

**penthiopyrad (Velista)**

**prothioconazole (Densicor)**

**pyraclostrobin (Insignia)\*\*\***

**fludioxonil (Medallion)\*\*\***

**fludioxonil + mefenoxam (Apron Maxx, Warden, Maxim®)**

**difenoconazole + fludioxonil (Instrata Elite)**

**cyproconazole (Sentinel, Alto)**

**flutolanil (ProStar, Contrast, Pedigree)**

**thiram (Spotrete, Tersan, Defiant)**

**thiophanate methyl (Cleary's 3336 & 26/36, T-Storm, Systec, Cavalier, T-Bird, Fungo, 'Systemic Fungicide')**

**iprodione (Chipco 26GT & 26019, Iprodione Pro, Raven 26GT, Tazz™, Eclipse ETQ)**

**iprodione + trifloxystrobin (Interface™)**

**polyoxin D zinc salt (Endorse, Affirm)\***

**Mancozeb + Copper hydroxide (Junction)**

**propiconazole** (Banner MAXX & GL, Kestrel, Echo, Spectator, Propensity, Prophesy™, Tilt, Strider, PropiMax)

**triadimefon** (Bayleton)

**chlorothalonil** (Concord, Count Down, Daconil Ultrex & Zn, Echo Ultimate, Manicure, Legend, Echo Dyad ETQ, Enclave™)

**chlorothalonil + acibenzolar-S-methyl** (Daconil Action)

**myclobutanil** (Eagle, Systhane, Laredo, Rally, Nova, Siskin, Myclobutanil 20EW, Golden Eagle™)

**maneb, mancozeb** (Fore, Dithane, Protect, WingMan, Manzate, Formec)

**vorlan/vinclozolin** (Curalan, Touche)

**trifloxystrobin + triadimefon** (Tartan, Armada)

**azoxystrobin + propiconazole** (Headway, Quilt)

**azoxystrobin + cyproconazole** (Quadris Xtra)

**azoxystrobin** (Heritage) + **thiamethoxam** (Meridian insecticide)

**azoxystrobin + difenoconazole** (Briskway)

**azoxystrobin + tebuconazole** (ArmorTech ZOXY-T; Strobe T)

**Solatenol®+difenoconazole+azoxystrobin+propiconazole** (Contend)

**chlorothalonil + thiophanate methyl** (Spectro 90, Peregrine, Tee-1-Up, ConSyst, Broadcide)

**chlorothalonil + fludioxonil** + propiconazole (Instrata)

**trifloxystrobin + triadimefon** (Armada)

**Mn + Zn + ethylenebis dithiocarbamate + thiophanate methyl** (Zyban, Duosan)

**etridiazole + thiophanate methyl** (Banrot)

**triticonazole** (Trinity, Chipco Triton)

**triticonazole + chlorothalonil** (Reserve™)

**tebuconazole (Lynx, Torque, Muscle<sup>®</sup>, ArmorTech TEB360, Clearscape ETQ, Skylark, Fame, Mirage<sup>™</sup> StressGard<sup>™</sup>)**

**Banner + Daconil (Concert)**

**metconazole (Tourney)**

**PNCB (ParFlo, Autilus)**

**PCNB + tebuconazole (Oreon or Premion)**

**Heritage (azoxystrobin) + Daconil (chlorothalonil) (Renown)**

**ammonium chlorides (Agrisan 20, Pro-Tech)**

**iprodione + thiophanate-methyl (Dovetail, Chipco 26/36, Proturf Fluid Fungicide)**

**potassium phosphate + chlorothalonil (Vitalonil)**

**pyraclostrobin + boscalid (Pageant, Honor)**

**pyraclostrobin + triticonazole (Pillar G)**

**Bacillus subtilis strain GB03 (Companion biofungicide)**

**Pseudomonas strain (Zio biofungicide)**

**Penthiopyrad (Velista)**

**Fluazinam (Secure biofungicide; Rotator)**

**Fluazinam + tebuconazole (Traction)**

**Chlorothalonil + tebuconazole (E-Scape ETQ)**

**fluopyram + trifloxystrobin (Exteris Stressgard)**

**Thiophanate-methyl + iprodione (Dovetail)**

**Sterol inhibitor fungicides such as Banner, Bayleton, Eagle, and Chipco Triton are effective preventatives when tank mixed with contacts: Daconil Ultrex, Echo, Concorde, Manicure, Fore, Rainshield, Medallion.**

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## Mini-Ring

*(Rhizoctonia zeae)* and Rhizoctonia leaf & sheath spot

**Activity:** The fungus is most active when CANOPY temperatures are 83-97°F. Any environmental stress (salinity, drought) increases the chance for infection. Visible symptoms usually occur in the late summer or early fall on bermudagrass and paspalum. This fungus initiates in the bottom of the thatch layer and moves upwards around and through the leaf sheaths---control needs to start from the soil pathogen standpoint. Infection occurs primarily within the leaf sheath and spreads to the outer sheath surface; therefore, contact fungicides, because of this internal plant protection, are ineffective at stopping infection. Mycelia of *R. zeae* are clear/white in color (*R. solani* mycelia are light brown in color).

### Treatment:

**Cultural**—control and manage thatch; apply contact+systemic fungicides prior to infection as a preventative; apply fungicides prior to sand topdressing. Monitor canopy temperatures, salinity, and moisture levels to minimize stress on the plant.

### Suggested Fungicides:

Aerate and apply systemic products such as Azoxystrobin + flutalonil. Refer to section on soil borne pathogens and fungicides used to control take-all/decline, Curvularia fading out, and other similar soil borne diseases. Tourney (metconazole--do not apply to bermudagrass cultivars). Mirage™StressGard™, Torque (tebuconazole). Prostar(flutolanil), Echo (myclobutanil), Endorse/Affirm (polyoxin-D), Lexicon (fluxapyroxad + propamocarb), Heritage (azoxystrobin), Briskway (azoxystrobin + difenoconazole), Secure/Rotator (fluazinam), Traction (fluazinam + tebuconazole). Stellar (fluopicolide + propamocarb), Xzemplar (fluxapyroxad). Trinity (triticonazol). Segway (cyazofamid). Mirage Stressgard/Torque (tebuconazole). COMBINE THIOPHANATE-METHYL WITH DIFFERENT MODE-OF-ACTION CHEMISTRY.

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# Brown Ring Patch or Waitea Reddish Brown Patch

*(Waitea circinata var. circinata)*

## or Basal leaf blight

*(Waitea circinata var. prodigus)* in seashore paspalum

Fungus is related to Yellow Patch fungus (*Rhizoctonia cerealis*) and high temperature brown patch (leaf and sheath spot; *Rhizoctonia zeae*), but is more lethal with greening inside the circle. Thrives in 77-95°F or 25-35°C temperatures and attacks the root system—maximum growth rates at 86°F or 30°C.

Symptoms include brown or yellow rings with yellow to pink mycelia. Often confused with fairy ring and necrotic ring spot. Also attacks creeping bentgrass, annual and roughstalk bluegrasses primarily on putting greens with low height of cut. First reported in Japan. Warm season grasses may serve as hosts to the organism.

### Basal leaf blight:

Progression from a foliar necrosis on the basal leaves to movement rapidly up the shoots and stolons. Profuse pink to yellow mycelia with small salmon to yellow aggregate sclerotia are developed most rapidly at temperatures of 25-35°C.

Cultural conditions associated with brown ring patch: low nitrogen fertility, thatch and mat accumulation, moist weather, fog and overcast conditions especially between 65-90°F.

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### Documentation:

S. Kammerer and P.F. Harmon. 2009. A new *Rhizoctonia* sp. Pathogenic to seashore paspalum turfgrass. *Phytopathology* 99(6 June supplement): S61.

Also: [http://www.turfpathology.ucr.edu/Downloads/Management\\_BRP.pdf](http://www.turfpathology.ucr.edu/Downloads/Management_BRP.pdf)

S. J. Kammerer and P.F. Harmon. 2011. Basal leaf blight, a new *Waitea* disease of seashore paspalum. *Golf Course Management* May: 92-94.

S.J. Kammerer. 2011. *Waitea* and *Rhizoctonia* pathogens of seashore paspalum: The role of salinity in disease expression and characterization of a new *Waitea circinata* variety causing basal leaf blight. University of Florida. 116 pages. PhD dissertation: 3532568.

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## **Suggested Fungicides:**

**Banner Maxx, Spectator, Echo, Kestrel, Tenacity, Propensity, Prophecy™, Tilt, Strider, PropiMax (propiconazole)**

**Endorse, Affirm (polyoxin D zinc salt) ++**

**Headway, Quilt (azoxystrobin + propiconazole) ++**

**Briskway (azoxystrobin + difenoconazole)**

**Instrata Elite (difenoconazole + fludioxonil)**

**Contend (Solatenol®+difenoconazole+azoxystrobin+propiconazole)**

**Heritage (azoxystrobin) Heritage Action (acibenzolar-s-methyl for stress tolerance inducement)**

**Heritage (azoxystrobin) + Meridian insecticide (thiamethoxam)**

**Quadris Xtra (azoxystrobin + cyproconazole)**

**Prostar, Contrast (flutolanil) \*\***

**Chipco 26GT, Raven 26GT, Eclipse ETQ (iprodione)**

**Interface™ (iprodione + trifloxystrobin)**

**Medallion (fludioxonil)**

**Disarm, Fame (fluoxastrobin)**

**Fame + C (fluoxastrobin + chlorothalonyl)**

**Fame + T (fluoxastrobin + tebuconazole)**

**Insignia (pyraclostrobin)**

**Pillar G (pyraclostrobin + triticonazole)**

**Lexicon (fluxapyroxad + pyraclostrobin)**

**Lynx, Torque, Muscle®, ArmorTech TEB360, Clearscape ETQ, Skylark (tebuconazole)\*\***



**Trinity (triticonazole) \*\***

**Triton FLO (triticonazole) \*\***

**Reserve™ (triticonazole + chlorothalonil)**

**Tourney (metconazole) \*\***

**Banner + Daconil (Concert)**

**PCNB (ParFlo, Autilus)**

**Renown (azoxystrobin + chlorothalonil)**

**ArmorTech ZOXY-T; Strobe T (azoxystrobin + tebuconazole)**

**Echo Propiconazole EC, Strider, Prophesy™ (propiconazole)**

**Secure biofungicide (fluazinam)**

**Traction (fluazinam + tebuconazole)**

**E-Scape ETQ (chlorothalonil + tebuconazole)**

**Mirage™ StressGard™, Torque (tebuconazole)**

**\*\*slow acting group of chemistry, but longer residual control**

**++early preemergence applications for best results**

**Note: repeated dual chemistry fungicide applications are more effective than single applications**

**Note: Headway and Endorse or Affirm provide very good 28 day curative activity**

**Note: thiophanate-methyl is not effective in controlling this disease**

**Note: annual bluegrass and roughstalk bluegrass are quite susceptible**

# Yellow (winter) patch

(*Rhizoctonia cerealis* AG-D(I))

**Symptoms:** leaves become etiolated and turn yellow. Round shaped patches 8-20 inches (200-500 mm) diameter. Halo pattern. Weak pathogen. Temperature range: 50-59°F (10-15°C). Loses pathogenicity at >77°F (25°C). Moves mechanically.

**Cultural control:**

- apply PGRs late fall/early winter
- low nitrogen level
- remove excess thatch
- maintain moist root zone
- cytokinin or gibberellin application
- avoid fungicide applications during winter dormancy
- Apply fungicides during the fall or autumn as a preventative

## Suggested Fungicides:

polyoxin Zn salt (Endorse, Affirm)

flutolanil (ProStar, Pedigree)—early to mid-fall

pyraclostrobin (Insignia)

fludioxonil (Medallion)

difenoconazole + fludioxonil (Instrata Elite)

thiophanate methyl (Cleary's 3336 & 26/36, T-Bird, T-Storm, Systec, Systar, Cavalier)

propiconazole (Spectator, Kestrel, Tenacity, Banner Maxx, Propensity, Prophecy™, Tilt, Strider, PropiMax)

propiconazole + chlorothalonil (Echo Propiconazole EC, Concert)

**azoxystrobin + propiconazole** (Headway, Quilt)

**azoxystrobin + chlorothalonil** (Renown)

**azoxystrobin + difenoconazole** (Briskway)

**azoxystrobin + tebuconazole** (ArmorTech ZOXY-T; Strobe T)

**Solatenol®+difenoconazole+azoxystrobin+propiconazole** (Contend)

**fluoxastrobin** (Disarm/Evito/Fame)

**fluoxastrobin + chlorothalonil** (Disarm C and M, Fame + C)

**fluoxastrobin + tebuconazole** (Fame + T)

**trifloxystrobin + triadimefon** (Tartan, Armada)

**triticonazole** (Trinity)

**triticonazole + chlorothalonil** (Reserve™)

**pyraclostrobin + triticonazole** (Pilar G)

**tebuconazole** (Lynx, Torque, Muscle®, ArmorTech TEB360, Clearscape ETQ, Skylark, Fame, Mirage™ StressGard™)

**triticonazole** (Triton)

**metconazole** (Tourney) (not on bermudagrass)

**potassium phosphate + chlorothalonil** (Vitalonil)

**pyraclostrobin + boscalid** (Pageant, Honor)

**fluxapyroxad + pyraclostrobin** (Lexicon)

**fluazinam** (Secure biofungicide; Rotator)

**fluazinam + tebuconazole** (Traction)

**fluopyram + trifloxystrobin** (Exteris Stressgard)

**mandestrobin** (Pinpoint)