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Circle No. 218 on Reader Inquiry Card



Ground Cover Characteristics-Characteristics of each ground cover are listed in common name category. Each number listed corresponds to a particular trait below.

Scientific name	Common name	Height	Characteristics
<i>Aegopodium podagraria</i>	Goutweed 1,2,4,8	14"	White flowers-June
<i>Ajuga reptans</i>	Carpet bugle 1,4,5	3-6"	Blue flowers-May colored foliage
<i>Arctostaphylos uva-ursi</i>	Bearberry 2,5,6,8,9,10	4"	Red fall foliage and berries
<i>Armeria maritima</i>	Thrift 4,5,6,10	6-12"	Pink flowers-May
<i>Asperula odorata</i>	Sweet woodruff 1,3	8"	White flowers-May
<i>Arenaria verna</i>	Moss sandwort 1,4,5,6	2"	White flower-May
<i>Aurinaria saxatilis</i>	Alyssum 9	6"	Gold flowers-April
<i>Calluna vulgaris</i>	Heather 2,6,7,9	10"	Mixed flowers- summer
<i>Cerastium tomentosum</i>	Snow-in-summer 3,5,10	6"	White flowers-June silver foliage
<i>Convallaria majalis</i>	Lily-of-the-valley 1,4,5,8	6"	White flowers-May fragrant
<i>Cotoneaster horizontalis</i>	Rock-spray coton. 6,8	36"	Red fall berries
<i>Cytisue species</i>	Broom 2,8,10	18"	Yellow flowers-June
<i>Epimedium species</i>	Epimedium 1,7	9"	Pink & yellow flower May
<i>Erica carnea</i>	Heath 2,6,7	12"	Pink & white flowers March
<i>Euonymus fortunei</i>	Wintercreeper 1,4,5,6,7,9	3"	Colored foliage
<i>Festuca ovina</i>	Ornamental fescue 2	18"	Blue foliage
<i>Hedera helix</i>	English ivy 1,4,5,6,8,9	3"	
<i>Hemerocallis species</i>	Daylily 1,2,3,9	18"	Varied flowers summer
<i>Hosta species</i>	Hosta, funkia 1,2,8,9	12"	Violet flowers-June unique foliage

- 1. SHADE** Plants for low light conditions.
- 2. DRY SOIL** Plants for poor, dry soil. These will generally become pests where growing conditions are good, so use them with caution.
- 3. WET SOIL** Plants that will tolerate wet conditions and poor drainage.
- 4. RAPID INCREASE** When funds are slim, time is tight and space is large, use plants that will grow rapidly and cover the ground in short period of time.
- 5. LOW GROWERS** Plants for neatly trimmed areas close to buildings.

- 6. EVERGREENS** Most desirable as they supply a green cover over the ground the entire year.
- 7. HIGH MAINTENANCE** These will require extra care, such as trimming or pruning, so be prepared.
- 8. LOW MAINTENANCE** Plants requiring little attention.
- 9. FOR SLOPES** Those with a heavy root systems that will hold soil in place.
- 10. FOR THE SEASHORE** Plants that will tolerate salt air.

woody plants will naturally be in evidence.

Improved landscapes

Ground covers reduce maintenance while improving the landscape. Besides replacing turfgrass, they can be used on steep slopes to prevent erosion and eliminate mowing.

Small areas and wet locations where mowing is difficult, areas beneath shade trees, wooded areas, and spots with rock outcroppings are also suited to ground covers.

Ground covers play a large role in landscape design. Present day land-

Spacing depends on the type of plant, its size, and how quickly it will spread.

scaping stresses simplicity. A few carefully selected plants may be widely spaced to create an interesting landscape, tied together as a unit by ground covers. The ground cover forms a green, horizontal mass that serves as a base or platform to trees and shrubs.

Ground cover can tie together the manicured and the informal, the mature and the newly-planted, and the various segments of the landscape.

Since ground covers discourage foot traffic, they can be used to direct the flow of pedestrians in and out of buildings or through parking areas. Some low-growing ground covers, such as sandwort, thrift, pearlwort, and thyme will even grow well between steppingstones, eliminating the need for weeding.

Selection criteria

When choosing ground covers, there are several items to consider—light, soil requirements, and desired maintenance levels to name a few.

Don't overlook foliage, for some are unusually colored and add certain highlights. These could include bronze or green-leaved ajuga, blue festuca, silver snow in summer, or purple wintercreeper.

Flowers-white candytuft, gold alyssum, pink creeping phlox, and blue ajuga-add needed color to the landscape.

Boston creeper has brilliant fall color, and cotoneaster has a fine display of berries.

The accompanying table outlines the characteristics of the most popular of the ground covers.

It may aid you in choosing plants

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Circle No. 151 on Reader Inquiry Card

Ground Cover Characteristics-Characteristics of each ground cover are listed in common name category. Each number listed corresponds to a particular trait below.

Scientific name	Common name	Height	Characteristics
<i>Iberis sempervirens</i>	Candytuft 6,8	12"	White flowers-May
<i>Juniperus chinensis sargentii</i>	Sargent juniper 2,5,6,8,9	6-12"	
<i>Juniperus conferta</i>	Shore juniper 2,6,8,9,10	6-12"	
<i>Juniperus horizontalis</i>	Creeping juniper 2,6,8,9,10	6-12"	
<i>Lamium</i> species	Lamium, Nettle 1,2,4,5	6"	Yellow & pink flower colored foliage
<i>Liriope spicata</i>	Liriope 1,4,6,8	8"	Purple & white flowers variegated foliage
<i>Mesembryanthemum</i>	Ice plant 2,4,5,9	6"	Varied flowers spring & summer
<i>Lysimachia nummularia</i>	Moneywort 1,3,4,5	2"	Yellow flowers-June
<i>Myosotis scorpioides</i>	Forget-me-not 3,5	4"	Blue flowers-May
<i>Pachysandra terminalis</i>	Pachysandra, spurge 1,4,5,7,9	6"	Insignificant flower
<i>Phlox subulata</i>	Creeping phlox 5,8	6"	Pink flowers-May
<i>Sagina subulata</i>	Pearlwort 1,5,6	4"	White flowers-summer
<i>Saponaria ocymoides</i>	Soapwort 1,2,5,8	3"	Pink flowers-summer
<i>Sedum</i> species	Stonecrop 3,4,5,7,9	5"	Varied-spring & summer
<i>Thymus vulgaris & serpyllum</i>	Thyme, Mother of Thyme 5,6	2"	Rose flowers-May
<i>Tiarella cordifolia</i>	Foamflower 1,2,4	8"	White flowers-May
<i>Veronica officinalis</i>	Speedwell 1,4,5,8	4"	Blue flowers-summer
<i>Vinca minor</i>	Periwinkle, myrtle 1,4,5,6,8,9	3"	Lavender flowers-May

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10. **FOR THE SEASHORE** Plants that will tolerate salt air.

based on their height, light requirements, soil preference, quick cover capabilities, maintenance, use, ever-green characteristics, and special characteristics such as flowers, fruit or foliage.

Planting

Even though you can plant ground covers throughout the growing season, early spring is the ideal time.

Spring plantings will be well established by winter, which will help protect them from freezing and thawing. Steep banks should be mulched with salt hay or straw until the ground

Ground covers are beneficial wherever a uniform, growing carpet is needed without having to cope with the maintenance of turfgrass.

cover is well established.

Spacing depends on the type of plant, its size, and how quickly it will spread.

One plant per square foot is a good rule for herbaceous material with further distance for larger woody plants. Closer spacing results in faster cover, but it is more costly. Small bulbs can be added when planting ground covers for spring color in between.

Once established, a ground cover needs little maintenance. Keep well weeded while growing, and weeding will not be needed in the future.

Watering and fertilizing requirements of most ground covers are low. Some plants may become aggressive and can be kept out of paths and turfed areas with brick or metal edgings. If they become overcrowded, they should be thinned out.

When a quick, temporary ground cover is needed, select an annual flower. The most reliable are sweet alyssum, portulaca, annual vinca, lobelia, annual candytuft, and annual phlox.

More information on ground covers is available free of charge from Bedding Plants Inc., a non-profit trade association that distributes information on the selection, planting, and care of annuals and perennials.

For your copy, send a self addressed, stamped envelope to Ground Covers, 210 Cartwright Boulevard, Suite W, Massapequa Park, NY 11762. **WT&T**

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THE PATCH DISEASES

At least 17 exist and the symptoms of some are similar. A positive identification is necessary for control and treatment.

by Dr. Houston Couch, Virginia Polytechnic Institute and State University



Corticium red thread of Manhattan ryegrass.



Bentgrass infected with take-all patch.



Necrotic ring spot of Kentucky bluegrass.



Rhizoctonia yellow patch of Kentucky bluegrass.

Turfgrass "patch" diseases are among the most difficult to diagnose.

The classic patch symptom pattern is characterized by the blighting of the majority of the leaves of the plants in a section of otherwise green turf.

Dr. Houston Couch is professor of plant pathology in the Dept. of Plant Pathology, Physiology, and Weed Science at the Virginia Polytechnic Institute and State University in Blacksburg, Va.

At present, there are 17 known patch diseases of turfgrasses. Various members of this disease group occur throughout the year on both warm- and cool-season grasses (see Table 1).

All of the complexities of diagnosis are highlighted within this group of diseases.

For example, some of the more dramatic symptoms associated with certain patch diseases can also be brought on by a variety of causes other than the pathogenic activity of microorganisms.

Plant stress caused by extremes in air temperatures, deficient or excessive soil moisture levels, improper mowing, or improper fertilization practices can also result in a browning of turfgrass in irregularly shaped patches.

In addition, the primary field diagnostic features for many of the patch diseases closely resemble each other. One symptom pattern, the "frog-eye" effect, is common to several of these diseases. It is roughly a circular area of blighted grass with a center of green, apparently healthy plants.

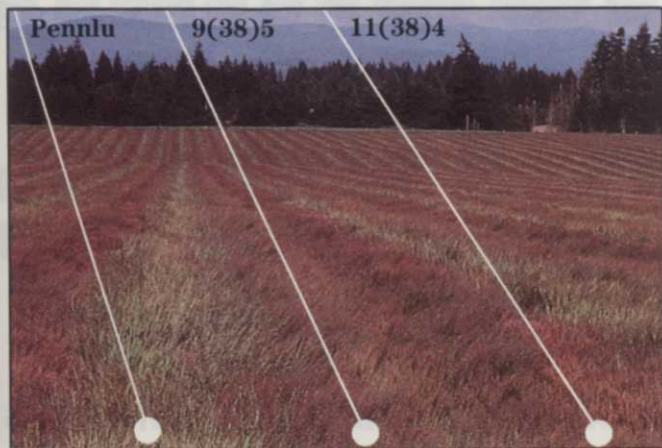
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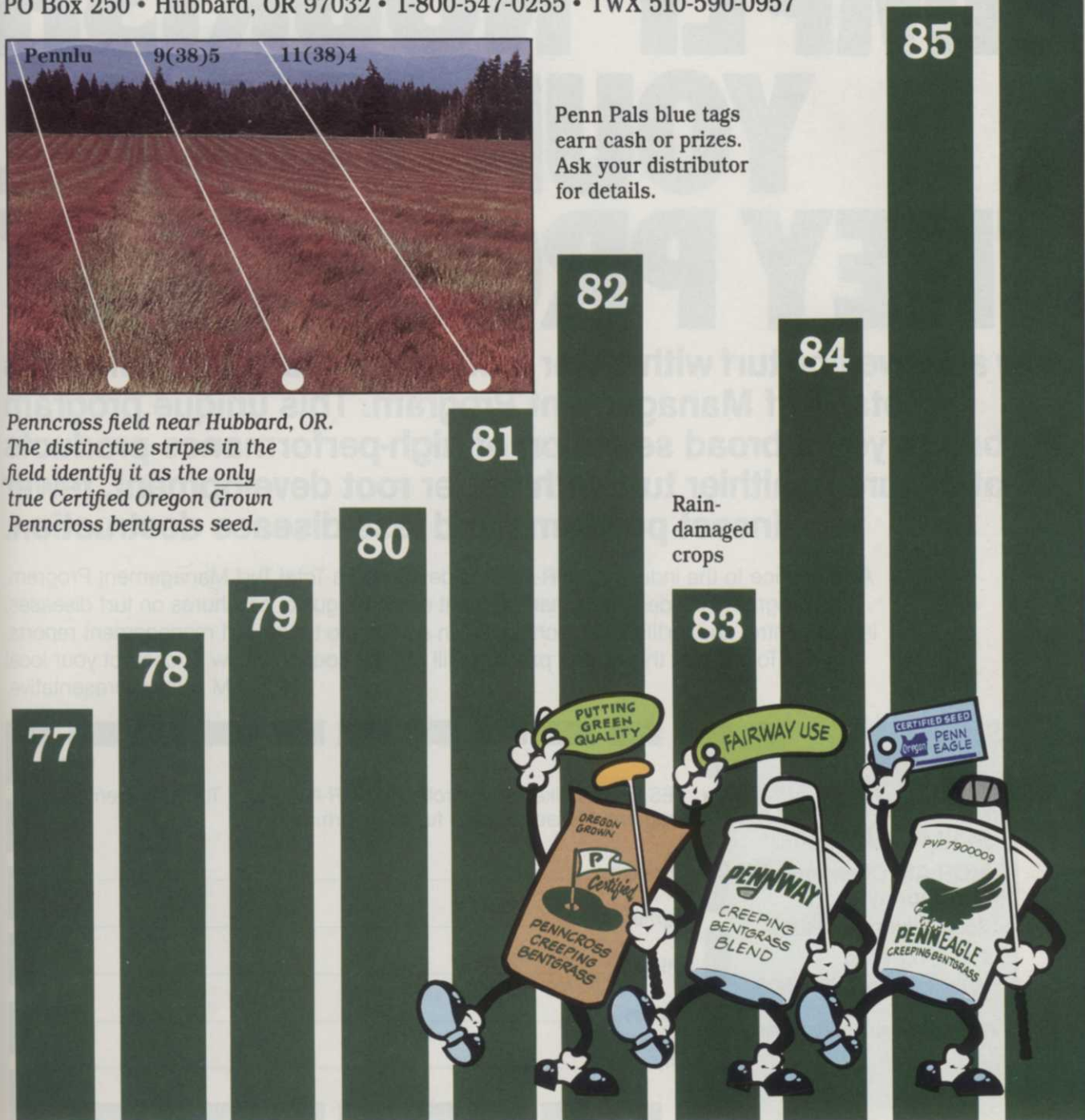
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At present, nine patch diseases are known to be capable of producing this type of symptom: spring dead spot of bermudagrass; fusarium patch; rhizoctonia yellow patch; necrotic ring spot; take all patch; pythium blight; fusarium blight; rhizoctonia blight, and sclerotium blight.

At times, a positive diagnosis of a patch disease can only be made after there has been a thorough review of the environmental conditions preceding problem development, an evaluation of the current management program for the grass (including mowing practices, fertilization rates and dates, watering practices, and the record of pesticide application), and a series of laboratory-based tests on diseased plant tissue and soil samples collected from the affected area.

In order to be successful in on-site identification of patch diseases, the identifier must:

1. Know what diseases could be occurring in the stand of grass at the time in question;
2. Be familiar with all of the primary and secondary field symptoms of each of these diseases;
3. Be able to recognize the particular field symptom patterns unique to each disease.

In this article we will review the key diagnostic features of the spring patch diseases of turfgrasses, highlight the weather and management conditions that favor their development, and give the control practices for each.

Necrotic ring spot

Necrotic ring spot is a newly recognized disease of turfgrass in North America, reported from the Pacific northwest, northeast, and north central sections of the U.S.

This disease is particularly destructive to Kentucky bluegrass and bentgrass, but also affects ryegrass, red fescue, tall fescue, and chewing fescue.

In the early stages of disease development, necrotic ring spot is seen as irregular patches of grass that have a general appearance of drought injury. The plants are often stunted or discolored, turning various shades of red, yellow or tan. These areas become dull tan to brown as the disease progresses.

The individual areas of dead grass are usually more or less circular in outline, and may range from a few inches to several feet in diameter.

When these patches first develop, the extent of leaf blighting within them is usually universal. However, many of the affected areas soon assume a distinctive "frog-eye"



Dr. Houston Couch

One symptom pattern, the 'frog-eye' effect, is common to several of these diseases. It is roughly a circular area of blighted grass with a center of green, apparently healthy plants.

appearance.

At times, the initial sites of disease may coalesce to form large, irregularly-shaped zones of blighted grass.

Under weather conditions favorable for necrotic ring spot, reddish-brown borders may develop between the patches of dead plants and the adjacent healthy grass.

Also, the thatch may decompose rapidly in the patch areas, leaving depressions that give a "sunken pocket" appearance to the turf.

Necrotic ring spot is incited by *Lepidosphaeria korrae*. Laboratory examination of the diseased plants reveal the dark brown strands (mycelium) of the fungus growing over the surface of the crowns and roots.

This can be a valuable aid to diagnosis, but must be used with some caution, for the fungus that incites take-all patch also produces similar

structures on the root and crown surfaces.

Development of necrotic ring spot generally occurs during the cool, wet weather of spring and fall. During April and May, heavy outbreaks of the disease have been noted after prolonged periods of rainfall.

Field research reports from Washington and Wisconsin indicate that Chipco 26019 and Banner provide good control of necrotic ring spot, while Bayleton has been found to be ineffective in controlling the disease.

Take-all patch

Take-all patch (ophiobolus patch) affects Kentucky bluegrass, ryegrass, red fescue, tall fescue, and bentgrass. It is generally considered to be only a serious problem in bentgrasses.

New outbreaks, usually appearing in late spring, are characterized by dead spots of grass a few inches in diameter. Initially, under stress conditions, the leaves of affected plants may range in color from bronze to a bright reddish brown. Eventually, they fade to a light tan.

In time, these areas may increase to two feet or more in width, and develop "frog-eye" patterns as the centers are invaded by the more resistant grass species.

Ultimately, the roots of affected plants will rot. Therefore, during the final stage of disease development, the plants are easily pulled loose from the soil.

Outbreaks of take-all patch are most severe during periods of prolonged rainfall. The disease will usually first appear along drainage slopes, in low areas, or in locations where there has been excessive irrigation.

Although initial outbreaks usually occur during cool, moist growing conditions, often times the overall symptoms will continue to increase in severity during periods of stress from hot, dry weather.

Take-all patch is more severe when the soil is alkaline. The disease will be more prevalent on grass growing in soils that are light-textured, low in organic matter, or low or unbalanced with respect to nitrogen, phosphorus, and potassium.

Take-all patch is most severe on bentgrass that has been seeded on recently-fumigated soil.

Take-all patch is incited by *Gaeumannomyces graminis* var. *avenae*. This fungus produces dark brown thread-like structures (mycelium) on the surface of the diseased roots and lower leaf sheaths, serving as an aid in laboratory diagnosis. One must distinguish it from similar structures produced by the fungus that

continued on page 96