

Weeds as Indicators of Environmental Conditions

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We sometimes forget that weeds are just plants and certain plants are well adapted to where they grow. For example, azaleas grow best in acid soils and iceplant grows best in full sun. Just as these well-known landscape plants have a set of optimal environmental conditions for their growth, so do weeds. In fact, one of the characteristics of certain weeds that make them successful competitors or invaders is that they can grow well under conditions that desirable plants do not, and over time, can take over a landscape bed or a turfgrass area.

Weeds can be classified as ‘generalists,’ which are plants that have enough phenotypic plasticity that they can adapt to a wide range of environmental conditions, or ‘specialists,’ plants that are well adapted to localized environmental conditions. A good example of a generalist is annual bluegrass. Annual bluegrass will grow up to about 6-8 inches if not mowed and will readily produce seed heads. However, under mowed condition, it will change its growth habit by adapting to the condition and producing seed heads lower than the mower blade. In very low mown areas such as golf greens, the seed heads are almost prostrate. This is in contrast to species which do not have much phenotypic plasticity such as common sowthistle. Mowing annual sowthistle, before seeds are formed is an acceptable method of control and one reason why it is only rarely found as a weed in turfgrass.

On the other hand, specialists are well adapted to certain conditions and usually become weeds not because they crowd out other desirable species but because the other species cannot grow well under the given environmental conditions. An example of a specialist is prostrate knotweed. This plant is often the only one growing in compacted areas such as dirt paths or around picnic tables. Prostrate knotweed has adapted to grow under these conditions and desired species, such as turfgrass, has not.

In order to manage weeds, one should be aware of the conditions that favor their growth. Soil fertility, soil moisture, compaction and other physical and chemical environmental conditions can be modified to reduce the conditions that would favor weed growth. The chart on the following page can be used to help determine why certain weeds are prevalent in landscape and turf areas. A caveat to using this chart is one should be aware that there may be locally adapted species that have been selected to grow in the local environment but these adaptations may not apply to the population in general. Another point to consider is that finding one or a few plants in an area does not necessarily mean that *the entire area* is compacted or has poor drainage or has another environmental condition conducive to that species’ growth.

Table 1: Potential environmental conditions indicated by weed populations

	Dry soil	Wet soil	Compacted soil	Low N	High N	Low mowing	Thin turf or newly seeded	Shade	High pH (alkaline)	Low pH (acid)	High salt	High organic matter	Low organic matter
Annual bluegrass		X	X		X	X		X					
Bentgrass		X			X	X				X			
Bermudagrass			X		X								
Black medic	X			X									
Broadleaf plantain			X	X					X				
Chickweeds		X	X		X	X	X	X	X			X	
Clovers			X	X		X							
Crabgrass		X	X			X	X						
Dallisgrass		X				X							
English daisy										X			
Goosegrass	X	X	X										
Liverwort		X											
Mallow					X	X							
Moss		X	X		X	X		X		X			
Nettles										X			
Nutsedge		X											
Pearlwort		X				X							
Pineappleweed			X				X						
Prostrate knotweed	X		X							X			
Purslane					X		X						
Russian thistle											X		X
Ryegrass		X	X			X							
Sedges		X											
Shepherdspurse									X		X		
Sowthistle		X			X								
Spurge (prostrate)	X		X	X		X							
Wild carrot		X											
Woodsorrel (Oxalis)	X	X			X								
Yarrow	X			X									