



OAK LEAF BLISTER

Leaf blister or leaf curl of oaks is caused by the fungus *Taphrina caerulescens*. This common disease occurs worldwide on about 50 species of oaks (*Quercus* spp.) mainly in the red and white oak groups. Ten species of oaks are known to become infected in the Midwest (Table 1) with red oak especially susceptible. In Illinois, the disease usually appears only during cool wet springs seldom causing serious damage. Heavy infections of red and other oaks may be unsightly but does **not** endanger the life of the trees.

Scientists believe that the causal fungus is actually a group of biologically distinct organisms that have become specialized in the oak species which they infect. The genus *Taphrina* is also responsible for leaf blisters or leaf curls on many other plants (Table 2) with the main economic importance on peaches, plums and cherries.

Symptoms

In late spring or early summer, young partially grown leaves develop circular, raised, wrinkled, yellowish white spots on upper surfaces with yellowish brown to gray depressions of the same size on the corresponding lower surfaces (Figure 1). The blisters are 3 to 30 millimeters in diameter and scattered over the leaf surface. Lesions later turn reddish brown with pale yellow margins and finally become a dull brown with age. Several blisters may merge which involve much or all of a leaf forcing it to curl (Figure 2) and can cause premature defoliation.

Disease Cycle

In the Midwest the *Taphrina* fungus overwinters as microscopic ascospores lodged under the bud scales. The spores germinate in the spring as the buds break open and the young leaves are expanding. The germ tubes of the spores penetrate young leaves directly through the cuticle as emerging hyphae grow



Figure 1. Leaf blisters on lower surface of red oak leaf (courtesy of Mark Gleason).



Figure 2. Leaf blister conspicuous due to raised, wrinkled appearance; diseased areas turn brownish with age (IL Natural History Survey photo).

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intercellularly mainly between the epidermal cells. A layer of asci forms in late spring or early summer between the outer epidermal wall and the cuticle. The asci, which contain the ascospores, push through the cuticle and rupture releasing tremendous numbers of ascospores (Figure 3). The expelled spores cover the surface of the blisters giving them a white to light tan, powdery appearance. They are spread about by air currents, splashing rains, and insects to the buds, where they become lodged under the bud scales, thus completing the disease cycle. The causal fungus may occasionally cause one or more secondary cycles of disease when buds open unseasonably in late spring or summer. Mature leaves are resistant to infection.

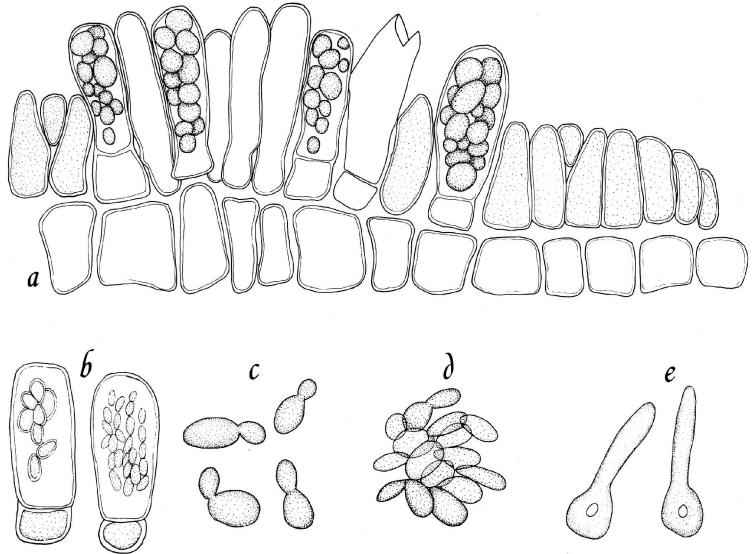


Figure 3. *Taphrina caerulescens*, cause of leaf blister or leaf curl of oaks: under high-power microscope; (a) vertical section of upper surface of leaf showing layer of epidermal cells and compact, palisade layer of asci, some containing ascospores, which have ruptured leaf cuticle; (b) two asci, one with 8 ascospores, other - ascospores budding; (c) ascospores budding (forming secondary spores); (d) late budding of ascospore; (e) two ascospores germinating.

In the southern states the *Taphrina* fungus overwinters as resting ascospores on the buds, twigs and branches of oaks. The disease is more common and severe in the southeastern and Gulf states than it is in the Midwest, especially on the southern red oak, conceivably because populations of ascospores remain higher throughout the winter.

Control

1. Since this disease is much more unsightly than harmful to oak trees, no control measures are usually suggested.
2. Collecting and composting or burning the leaves as they drop may be of some benefit in reducing the inoculum for the following spring.
3. A single **dormant** fungicide spray, applied **before** the buds begin to swell in early spring, will control the disease but is not commonly recommended. Fungicide sprays applied **after** budbreak are ineffective. Suggested fungicides to use are given in Illinois Homeowner's Guide to Pest Management. This circular is revised annually.

Table 1. Oaks grown in the Midwest which are susceptible to leaf blister caused by *Taphrina caerulescens*

White oak	Pin or Spanish oak
Scarlet oak	Chinquapin or dwarf
Jack or northern pin oak	chestnut oak
Laurel or single oak	Post oak
Bur or mossy-cup oak	Black or yellow-barked oak
Blackjack or jack oak	

Table 2. Other plants grown in the Midwest infected by species of *Taphrina*.

River, silver or soft maple	American hophornbeam
Red maple	Bigtooth or large-toothed aspen
(Black leaf blister)	(Catkin deformity)
(Leaf blight)	Black poplar
Hard or sugar maple	Black or Lombardy poplar
(Brown leaf blister)	Quaking or trembling aspen
Four-speckled or white alder	Tall cinquefoil
(Catkin deformity)	Common cinquefoil
Mountain or water birch	Dwarf sumac
(Witches' broom)	Skunkbush
Canoe, paper or white birch	Marsh or meadow fern
(Red leaf blister or leaf curl)	(Leaf gall)
American hornbeam	American elm
American filbert or hazelnut	Cork or rock elm
Brittle or fragile fern	Red or slippery elm
(Leaf gall)	
Fern, no common name	
(Leaf gall)	