

## ANNOSUS ROOT ROT MANAGEMENT IN ALABAMA

### How to Identify Stands Affected by Annosus Root Rot

Annosus Root Rot is a widespread disease caused by the fungus *Heterobasidion annosum*, formerly called *Fomes annosus*. Conks provide positive identification of annosus root rot. Conks are fruiting bodies of the causal fungus. These fruiting bodies vary in shape from small masses or pustules to bracket-like conks. The upper surface is light tan to dark or reddish brown. The lower surface is white and covered with pores. The outer margin of the lower and upper surface is white and has no pores. The colors darken after the conk passes through the winter. Conks are difficult to tear but attempts will reveal the characteristic leathery consistency. Pieces of litter and plants often project where a conk has grown around these materials in the duff. The conks are connected to the stems of symptomatic trees at about the soil line. It is best to look under trees with vines and deep litter on the north side of the base because conks are more likely to form in more humid places. Conks may also be found on exposed lateral roots and in humid cavities in the root and soil mass of windthrown trees. Most conks are produced in the winter and spring in Alabama. Insects may destroy them before summer or fall. Not every infected tree will have a conk and in some infected stands there are none at all. This is common in stands that have been burned. If no conks can be found, growing the fungus from suspect trees in the laboratory can identify the disease.

Annosus root rot symptoms can be confused with those of littleleaf disease. In the absence of conks indicating annosus root rot, it is helpful to remember that littleleaf disease usually occurs on poorly drained clay soils as opposed to the well-drained sandy soils on which annosus root rot is most commonly found.

It is important to determine whether annosus root rot is present in stands with bark beetle infestations. Bark beetles infestations are often associated with annosus root rot and may indicate presence of the disease

Conks are not present all the time so a forester could rely on the following symptoms and combinations to identify ARR:

- Pine stands with dead and dying trees often in clusters or rows.
- Trees leaning or blown over due to a lack of supporting roots.
- Stringy white rot of the wood in the roots and/or butt.
- Sparse crowns with off-color needles, often with abundant cones.
- Resin-soaked areas of roots ahead of discolored, dead, or rotted end sections; observed by digging lateral roots.
- Mortality beginning the second or third year following thinning and continuing for several years.
- Pine stands infested with southern pine beetles or Ips bark beetles often also have annosus root rot.

### Annosus Root Rot Soil Hazard Rating

In Alabama stands with annosus root rot can be found from north of the Tennessee River to the Gulf of Mexico. In this statewide range it is possible for any pine or stand of pines to have annosus root rot, but vigorous stands on suitable sites may suffer less damage. A high

hazard site is one on which annosus root rot can reasonably be expected to cause mortality and growth loss of a value greater than the cost of prevention. The most consistent and easily used indicator of high hazard sites is well-drained, sandy soil to a depth of at least 12". These soils consist of 70% or more sand. Organic soils and soils with indicators of poor internal or external drainage are a low hazard. The soil types in Alabama have been classified as to High or Low hazard for ARR.

This rating system should be used in sites for determining whether to treat with Borax. All stumps on High hazard soils should be treated with Borax at the time of thinning.

### **Prevention**

The basis for prevention of annosus root rot is to maintain healthy stands and to recognize high hazard sites. Trees planted out of their natural range on high hazard sites are more susceptible to annosus root rot, according to observations in Alabama. Longleaf pine apparently usually resists infection on high hazard sites. Silvicultural practices such as planting on wider spacing and thinning before many trees become suppressed or the stand stagnates should help to avoid widespread infection. To be confident that annosus root rot is prevented it is highly recommended that the stumps be treated with borax when thinning in a high hazard area.

Borax prevents spores of *H. annosum* from infecting stumps and thus prevents *H. annosum* growth through the roots and infection of the healthy residual stand. Ten (10) Mole technical grade borax is available in a granular formulation for manual salt shaker style application

### **Control**

Once annosus root rot has become established in a stand and substantial mortality is occurring, control becomes necessary. This is the case if the mortality exceeds the annual growth rate. It is extremely hazardous to thin further because the infection would be expected to accelerate in the cut stumps. Root damage incurred during thinning in the presence of *H. annosum* would promote infection. The residual stand would be expected to deteriorate rapidly. A stand in which annosus root rot is generally present and dispersed should be sold in a clearcut. The problem usually becomes apparent two to three years after a thinning cut, often when the trees are close to sawtimber size.

The decision is whether the stand should be clear-cut immediately, or whether the losses can be absorbed until the remaining trees have reached sawtimber size, and can be sold for a higher price that would make up for the losses absorbed. After clear-cutting, the site may be regenerated in pine with only a small mortality percentage due to annosus root rot.

A stand may have a localized group of trees infected with annosus root rot. This localized group of trees should be salvaged including a buffer strip of green trees as wide as the average height of the dominant trees in the stand. Treating the stumps with Borax will prevent annosus from spreading out of the spot. The remainder of the stand should be suspected of having low levels of *H. annosum*. To prevent infection when thinning the remaining stand, the stumps should be treated with Borax.

If southern pine beetles or Ips bark beetles are present or a potential hazard on high hazard annosus root rot sites their prevention or control must be reconciled with prevention or control recommendations for annosus root rot.

## ANNOSUS ROOT ROT HAZARD RATINGS BY SOIL TYPE

<u>SOIL SERIES</u>	<u>ARR</u>	<u>SOIL SERIES</u>	<u>ARR</u>	<u>SOIL SERIES</u>	<u>ARR</u>
Adaton	Low	Bladen	Low	Collegedale	High
Ailey	High	Blanton	High	Conasauga	Low
Alaga	High	Bodine	High	Congaree	Low
Albany	Low	Bomar	High	Cowarts	High
Albertville	High	Bonifay	High	Coxville	Low
Alcoa	High	Bonneau	High	Craven	Low
Allen	High	Boswell	Low	Crevasse	High
Alpin	High	Bradyville	High	Crossville	High
Altavista	Low	Brantley	High	Cumberland	High
Americus	High	Braxton	High	Davidson	High
Amy	Low	Bremo	High	Dellrose	High
Angie	Low	Brewton	Low	Demopolis	High
Annemaine	Low	Brilliant	High	Dewey	High
Apison	High	Brooksville	Low	Dickson	High
Appling	High	Bruno	High	Docena	Low
Aragon	High	Buncombe	High	Dorovan	Low
Ardilla	Low	Byars	Low	Dothan	High
Argent	Low	Cadeville	Low	Dowellton	Low
Armour	High	Cahaba	High	Duckston	Low
Armuchee	High	Cane	Low	Dulac	High
Arundel	High	Canton Bend	High	Dunbar	Low
Atmore	Low	Cantuche	High	Dundee	Low
Augusta	Low	Capshaw	High	Duplin	Low
Axis	Low	Carnegie	High	Durham	High
Bama	High	Cartecay	Low	Egam	Low
Barfield	High	Catalpa	Low	Ellisville	High
Basin	Low	Cecil	High	Emory	High
Bassfield	High	Cedarbluff	Low	Emporia	High
Baxterville	High	Chastain	Low	Enders	High
Bayboro	Low	Chastain CLY	Low	Ennis	High
Beason	Low	Cheaha	High	Enoree	Low
Beatrice	Low	Chenneby*	High	Escambia	Low
Benndale	High	Chewacla	Low	Esto	High
Bethera	Low	Chipleay	High	Etowah	High
Bewleyville	High	Chisca	High	Eulonia	High
Bibb	Low	Choccolocco	High	Eunola	Low
Bigbee	High	Chrysler	Low	Eustis	High
Binnsville	High	Cloundland	Low	Eutaw	Low
Birmingham	High	Colfax	Low	Faceville	High

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Falaya	High	Izagora	Low	Maxton	High
Falkner	Low	Johnston	Low	Mayhew	Low
Firestone	High	Jones	High	McLaurin	High
Forestdale	Low	Kalmia	High	McQueen	High
Freemanville	High	Kaufman	Low	Mecklenburg	High
Fripp	High	Ketona	Low	Mimosa	High
Fruithurst	High	Kinston	Low	Minter	Low
Fullerton	High	Kipling	Low	Minvale	High
Fuquay	High	Kirkville	High	Montevallo	High
Garner	Low	Kolomoki	High	Mountainburg	High
Gaylesville	Low	Lafitte	Low	Myatt	Low
Georgeville	High	Lakeland	High	Nankin	High
Goldsboro	High	Leadvale	High	Nauvoo	High
Gorgas	High	Leaf	Low	Nectar	High
Grady	Low	Leeper	Low	Nella	High
Grasmere	High	Leesburg	High	Norfolk	High
Greenville	High	Lenoir	Low	Notcher	High
Gritney	Low	Leon	Low	Ochlockonee	High
Grover	High	Levy	Low	Ocilla	Low
Guthrie	Low	Linker	High	Oktibbeha	Low
Gwinnett	High	Lobelville	Low	Ora	High
Hamblen	Low	Lockhart	High	Orangeburg	High
Hanceville	High	Locust	High	Osier	Low
Hartsells	High	Louisa	High	Pacolet	High
Hector	High	Louisburg	High	Pactolus	Low
Heidel	High	Lucedale	High	Palmerdale	High
Helena	Low	Lucy	High	Pamlico	Low
Herndon	High	Luverne	High	Pansey	Low
Hiwassee	High	Lyerly	Low	Pelham	Low
Hollywood	Low	Lynchburg	Low	Persanti	Low
Holston	High	Macon	High	Pickwick	High
Houlka	Low	Madison	High	Pikeville	High
Houston	Low	Malbis	High	Pine Flat	High
Hulett	High	Mantachie	Low	Pirum	High
Humphreys	High	Marietta	Low	Plummer	Low
Hyde	Low	Marlboro	High	Poarch	High
Iredell	Low	Marvyn	High	Ponzer	Low
Irvington	High	Masada	High	Prentiss	High
Iuka	High	Mashulaville	Low	Prim	High

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Pruitton	High	Tallapoosa	High		
Rains	Low	Tanyard	Low		
Red Bay	High	Tarboro	High		
Rembert	Low	Tasso	High		
Remlap	High	Tatum	High		
Riverview	High	Tellico	High		
Roanoke	Low	Tifton	High		
Robertsdale	Low	Toccoa	High		
Rumford	High	Townley	High		
Ruston	High	Trinity	Low		
Sacul	Low	Troup	High		
Saffell	High	Tuscumbia	Low		
Sango	High	Uchee	High		
Saucier	High	Una	Low		
Savannah	High	Urbo	Low		
Sawyer	Low	Vaiden	Low		
Scranton	Low	Vance	High		
Sequatchie	High	Varina	High		
Shadygrove	Low	Wagram	High		
Shatta	High	Wahee	Low		
Shubuta	High	Watsonia	High		
Smithdale	High	Wax	High		
Smithton	Low	Waynesboro	High		
Starr	High	Wedowee	High		
Staser	High	Wehadkee	Low		
State	High	Weogufka	High		
Stemley	High	Weston	Low		
Sterrett	Low	Whitwell	Low		
Stough	Low	Wickham	High		
Suffolk	High	Wicksburg	High		
Sullivan	High	Wilcox	Low		
Sumter	High	Wilkes	High		
Sunlight	High	Wynnville	High		
Sunsweet	High	Yemassee	Low		
Susquehanna	Low	Yonges	Low		
Sylacauga	Low				
Tadlock	High				
Taft	Low	* -			
Talbott	High	High for Chenneby soils designated AL0026			
		Low for Chenneby soils designated AL0105			