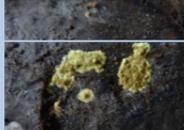
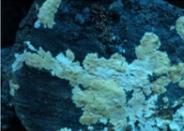


Harmful contaminants of Shiitake bed-logs

	<i>Hypoxylon</i>	<i>Trichoderma & Hypocrea</i>	<i>Diatrype & Graphostroma</i>	<i>Schizopora & Phlebia</i>	Slime mould
Contaminants	 <p>Early-stage <i>Hypoxylon</i> (yellowish green mycelia on cut end and surface of log)</p>  <p>Mature <i>Hypoxylon</i></p>  <p>Penetration into the interior of bed-log comprising live wood</p>  <p>Lines delineating contact with shiitake mycelia</p>	 <p><i>Hypocrea pachybasioides</i></p>  <p>Fruiting bodies and mycelia</p>  <p><i>Hypocrea lactea</i></p>  <p><i>Hypocrea</i> sp.</p>  <p>Early-stage <i>H. lactea</i> surrounding inoculum, growth on log end</p> 	 <p><i>Diatrype stigma</i> spore horn (tissue under bark not colonized by shiitake)</p>  <p><i>D. stigma</i> spore horns, <i>Trichoderma</i> infection inside wood</p>  <p><i>Graphostroma platystoma</i> (log surface and interior)</p>	 <p><i>Schizopora flavipora</i> and fruiting body induction facility</p>  <p><i>Phlebia tremellosa</i> and induction facility (June Chukha)</p>  <p><i>S. flavipora</i> infection through contact</p>	 <p>Attached slime mould, dead shiitake mycelia inside bed-log.</p>  <p>Slime mould</p>  <p>Dead shiitake mycelia and entry of bacteria</p>
Environment	<ul style="list-style-type: none"> • Ascospores on logs germinate under high temperature. • Germination ratio of ascospores at 25°C–35°C is greater than 90% within 3 days. • ≥70% germination after 10 continuous days at 15°C or higher. 	<ul style="list-style-type: none"> • Occurs in hot, humid environments. • Takes advantage of heat and other stresses on shiitake mycelia to attack. • Also parasitizes and kills fungi other than shiitake. • Anamorph → <i>Trichoderma</i>; teleomorph → <i>Hypocrea</i> 	<ul style="list-style-type: none"> • <i>Diatrype</i> ascospores germinate between log cutting and inoculation as a result of being exposed to direct sunlight, with subsequent mycelial growth under high-temperature, dry conditions. • <i>G. platystoma</i> tends to occur in hot regions, and exhibits slower growth than <i>D. stigma</i>. 	<ul style="list-style-type: none"> • Both species occur after 1 to 2 years under hot, humid conditions. 	<ul style="list-style-type: none"> • Occur on logs that have been infected by <i>Hypocrea</i> spp. and <i>Trichoderma</i> spp.. • Under extremely humid conditions, they are prevalent in logs that have been weakened by shiitake mycelia.
Characteristics	<p>Forms black band upon contact with shiitake and other mycelia.</p> <p>Prefers dry conditions. Grows inwards as the log ends and inner bark begin to dry.</p>	<ul style="list-style-type: none"> • Parasitic fungus. Kills shiitake mycelia. • Narrow "highly-active" temperature range. • Grows vigorously in high-temperature, high-humidity environments. • Becomes highly active at ≥25°C and ≥85% humidity 	<ul style="list-style-type: none"> • <i>Diatrype</i> produces conspicuous red spore horns on bark surface in the spring and summer; thus, it is easy to detect. • After this, the bark starts to peel, revealing the underlying stroma. • This fungus does not attack shiitake mycelia. However, the spore horns and stroma can serve as entry points for <i>Hypocrea</i> spp., which parasitize shiitake and, thus, should be monitored carefully. 	<ul style="list-style-type: none"> • Has strong ability to break down wood and quickly damages logs. • Spreads through contact. • Wood colonized by these species are prone to bacterial contamination. 	<ul style="list-style-type: none"> • In logs where this slime mould is observed, the wood under the bark is severely rotted and smells strongly of bacteria. • In many cases, the rotting is so severe that the wood falls apart when touched.
Control measures	<p>Do not allow log surface to become hot in the fall or spring.</p> <p>If mycelia of this fungus (greenish gray to greenish yellow) are observed on log end or bark surface, keep log surface from becoming hot and drying out.</p>	<ul style="list-style-type: none"> • Do not heat stress shiitake mycelia (especially after log colonization has been completed). • Keep the surrounding area sterile/clean. 	<ul style="list-style-type: none"> • Accelerate shiitake mycelia growth. To do this, perform early inoculation. • Do not allow the bark surface to dry out rapidly. Exposure to direct sunlight can cause rapid drying of the surface, especially in the spring. 	<ul style="list-style-type: none"> • Do not leave logs under hot, humid conditions for long periods of time. • Because these species spread through contact, infected logs must be quarantined as soon as they are found. 	<ul style="list-style-type: none"> • After logs have been completely colonized by shiitake mycelia, ensure adequate air flow to prevent stress due to high temperatures and/or oxygen deficiency (excessive moisture). • If detected, do not store the infected logs near others logs (quarantine or discard) to prevent the spread of <i>Trichoderma</i> spp. or <i>Hypocrea</i> spp.