

Plant Fungus *Chondrostereum purpureum*: Also infects humans

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Abstract

Chondrostereum purpureum, is a plant fungus causing silver leaf disorder of plant life, especially of the rose family. It attacks in the main species of the rose family. Hosts with compromised immune system are maximum liable to fungal infection but healthy and immune competent individuals also are frequently pronounced to have fungal infections. In this situation the infections can be related to exposure to a huge inoculum.

Keywords: *Chondrostereum purpureum*; Plant pathogen; Paratracheal abscess; Silver leaf

1. Introduction

The fungus pathogenic to plants *Chondrostereum purpureum* is responsible for the fungus disease known as silver leaf, which harms trees. It affects several species of the rose family *Rosaceae*, specifically the *Prunus* genus. The disease is growing and often fatal. The common name derives from the silver color of the leaves on affected branches. The disease is spread by aerial spores landing on recently bare sapwood. Due to this reason plums and cherries are cut back in summer, when spores are minimal to be present and when infection is observable on poming fruits like “pears and apples”, silver leaf can also appear. Plums are very weak [1].

This fungus was previously known by the name *Stereum purpureum* Pers., but recent taxonomy indicates that it is only closely connected to *Stereum* and actually belongs to the order Agaricales, whereas *Stereum* belongs to the order Russulales [2].

Although, reports of fungal infections in healthy and immunocompetent people are also common. Hosts with weakened immune systems are most susceptible to fungal infection. In this scenario, exposure to a big inoculum may be linked to the infections. As a result of structural and systemic differences between plants and animals, microbial invasion faces a number of difficulties. Plant and animal cells are structurally similar at the cellular level [3]. Few among the millions of fungal species meet all four requirements that must be completed in order to infect and invade either humans or animals:

- A high tolerance towards temperature.
- Ability to invade the human host.
- Having the capacity to lyse and absorb human tissue.
- Resistance to the human immune system [4].

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However, the different progressive pathways of animal and plant microbe exist, evidence of human or animal infection by phytopathogens, has recently emerged. Newer fungal infections as well as numerous zoonotic viral and bacterial diseases could emerge as a result of global warming, ecosystem disruption, worldwide commerce and travel, and unexpected urbanization [5]. The general consensus is that phytopathogens are opportunistic infections targeting immunologically compromised populations and lack animal and human specificity [3].

2. Characteristics

The spores are spherical cylinders that measure around 5-8 x 3 x 4 m. The clamp connections in the monomitic hyphal structure. Although it can be a significant parasite of living trees, it usually appears on old stumps and dead wood. Additional Prunus, apple, pear, willow, poplar, maple, hornbeam, plane, oak, elm, lilac, and several more broad-leaved species are among the many other broad-leaved plants it affects in addition to plum trees [12]. Geographically, it's about as widespread as its hosts - it's common in forests, orchards, and tree plantations in temperate climates.

2.1. Ecology of *Chondrostereum purpureum*

Invading predominantly the stumps, branches, and trunks of deciduous tree species, *C. purpureum* is a saprophytic or mildly pathogenic pioneer species, while it is occasionally seen in conifers as a saprophyte [7, 8, 9]. Purple fungi are commonly found on broadleaf trees' stumps and dead wood. (Fig. 1). In fruit trees, the fungus can also causes silver leaf disease [10]. The release of spores by *Chondrostereum purpureum* is dependent on high humidity, as is common for basidiomycete [11].

2.2. Pathogenic for human

Only a few fungi, such as ringworm or athlete's foot, can infect people, but specialists have long cautioned that due to fungi's capacity for rapid evolution, this situation may soon change. The threat may be serious since fungal diseases can swiftly develop resistance to antifungals or even cause the immune system to turn against itself.

A single case report confirmed human infection with *Chondrostereum purpureum* in a non-immunocompromised man who had been working with infected plant material. It was resolved by treatment with antifungal medication, but indicates potential for a broader host range for this fungus than previously believed [6].

2.3. Plant Fungus: Destruction of Crops; Impacts Humanity

"Cross-kingdom human infections and their potential plant reservoirs have essential effects on how infectious diseases develop, following to Dutta and Ray". Additionally, fungi are responsible for a number of plant diseases that kill millions of plants and crops as well as for the production of toxins and these toxins are region of food contamination and also a causative agent for toxicity. "Over the previous several decades, many new pathogenic fungi have emerged," they concluded. "A remarkable emergence of the multidrug-resistant fungus *Candida auris* has spread all around the world and also become a major threat. The worsening of global warming and other civilizational activities opens Pandora's Box for newer fungal diseases."

2.4. Could infect more humans in future

- Just a few of the millions of fungi that exist in the environment can infect people and animals.
- However, the incident in Kolkata demonstrated the possibility of both healthy and immunocompromised people contracting such fungus.
- The fungus can become infections for humans if they are able to evade the host immune system and the phagocytosis pathway. Fungal organisms that can flourish between 35 and 37 °C can develop into human pathogens or commensal flora. The pathogen can infect people and is especially likely to do so in those with impaired immune systems since it enters the body through damaged skin and the respiratory system.
- Unexpected urbanization, alteration of ecosystem, global warming, international travel and commerce may be the region for emergence of not only newer fungal infection but also different type of bacterial and zoonotic viral infections.

2.5. Diagnosis of fungal infection

Molecular techniques are useful in the quick detection and identification of unusual organisms, particularly when morphological examination is not possible for fungal pathogens that are not recovered in cultures or when morphological data are inconclusive. Conventional methods for the diagnosis of fungal infection, such as direct microscopic detection, culture, and histopathological examination, are very important. Targeted therapy requires

accurate identification. Due to the inherent resistance of many fungal infections to different antifungals, recommendations should be based on specific clinical case experience [6].

2.6. Treatment

Treatment of a fungal infection is multimodal, along with proper antifungal therapy, surgical removal of the pus is also extremely important, and prevention of exposure and reversal of risk factors are also recommended. At that time, having no idea of the choice of antifungal against this rare fungus, we chose a safe, broad-spectrum oral antifungal that would be well tolerated by the infected patient. Cross-kingdom pathogenicity needs much work to obtain insight into the mechanisms involved, leading to possible references to control and acquire these infections.

3. Conclusion

While this review of the literature gives a thorough summary of what is currently known about this fungus and human infections caused by it. Due to their cross-kingdom pathogenicity, these infections need to be controlled and contained, which requires extensive research into the mechanisms behind them. We need to do further research and investigations to get more knowledge about this fungus.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest.

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