MYCOPHAGES

Mycoviruses or Mycophages: Phages or viruses infecting fungi. Mycovirology field of science studying Mycophages.

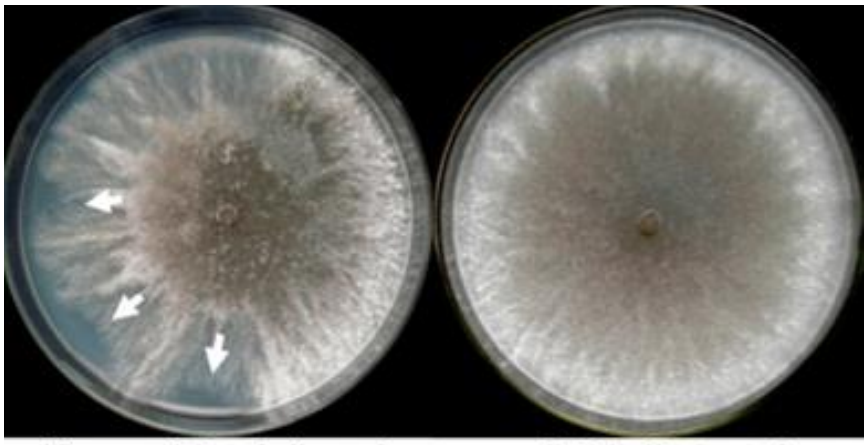
Consider only those phages that can be isolated from fungi and have the ability to infect healthy fungi. Many viruses associated with fungi are characterized by electron microscopy known as VLP or Virus Like Particles.

Heterogenous group of viruses affecting all 4 classes of fungi: Zygomycota, Ascomycota, Deuteromycota and Basidiomycota. Found with animal/human and plant fungi.

History and Importance

-1962. Bolling showed Mushroom "*Agaricus bisporus*" with symptoms called as La France or X disease: X disease, watery stripe, dieback and brown disease. Symptoms include:

Reduced yield, Slow and aberrant mycelial growth, Waterlogging of tissue Malformation, Premature maturation, Increased post-harvest deterioration (reduced shelf life)



Virus particles challenged PBS buffer treated

(Webster J. & Weber R. W. S. (2007). Introduction to fungi 3rdedition. New York: Cambridge University press.)

-Use as a Biocontrol Agent: Best known mycovirus is Cryphonectria parasitica hypovirus 1 (CHV1). CHV1 is used as a biocontrol agent against the fungus C. parasitica, the causative agent of chestnut blight.

Table: Fungal pathogens controlled by Mycophages			
S.No	Fungus	Disease	Virus
1.	Rhizoctonia solani	Sheath Blight	Mitovirus Virus M2
2.	Fusarium graminearum	Head Bliught	Ophistoma mitovirus
3.	Botrytis cinera	Grey Mods	BVF and BVX
4.	Magnaparthe oryzae	Rice Blast	MoV1 and MoV2 (TotiVirus

- Replication of Mycoviruses: Diverse genome group, predominant ds RNA phages (Group III)
- Phages code for RNA polymerases ds RNA to +ss RNA, ss RNA to ds RNA (genome)
- ssRNA/mRNA template for protein synthesis

-**Hypovirulence study**: Also used for studying hypovirulence (decreasing virulence) in fungi. Mechanisms include RNA silencing and affecting signal transduction pathways

- **Killer phenomenon:**

1st observed in 1877 L. Pasteur

In, Yeast *Saccharomyces bouradi*i, phage positive killer certain code for toxin which may kill non phage containing cells.

Also observed *in S. cerevisiae* and *Ustilago maydis*

-Taxanomy: Majority (70%) belong to ds RNA icosahedral structure (Totiviridae, Reoviridae, Chrysoviridae), Hypoviridae

Within ds RNA genome, 2 serological group classificaiton

(i) The Penicillium chrysogenum virus group, and

(ii) The P. stoloniferum virus – S (PsV-s) group.

The member viruses within each of these groups are serologically related.

Rest 30% are positive strand ssRNA genome (similar to Potyvirus)

Transmission

-Hyphal fusion (anastomosis) or through sporogenesis

Symptoms

- Many remain symptomless
- Symptoms may include pigmentation, reduced growth, lack of sporulation

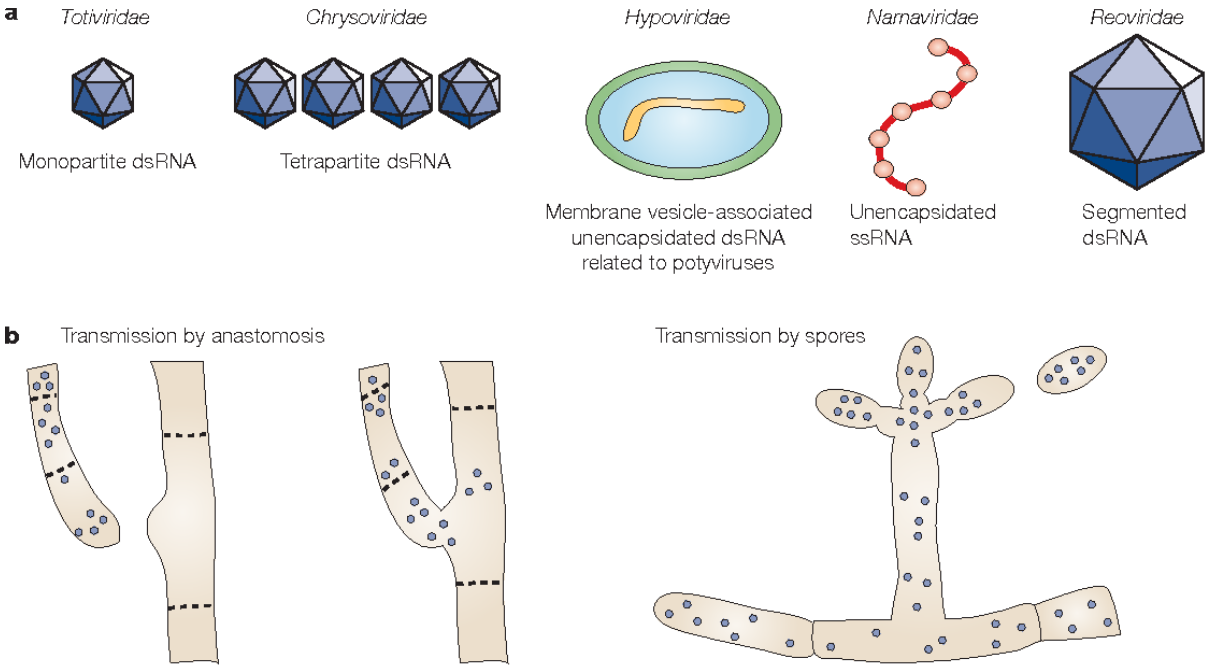


Figure 1 | **Taxonomic families and primary modes of hypovirulence-associated mycovirus transmission. a** | Taxonomic

References

(Webster J. & Weber R. W. S. (2007). Introduction to fungi 3rdedition. New York: Cambridge University press.)

https://mycoviruses.blogspot.com/2014/11/sclerotiniasclerotiorum-and.html

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