CYANOPHAGES

Cyanophages are the viruses that attack on cyanobacteria i.e. members of the blue-green algae in general.

1963. Safferman and Morris isolated a virus from the waste stabilization pond of Indiana University (U.S.A) that attacked and destroyed the three genera: Lyngbya, Plectonema and Phormidium.

Therefore, they named the virus by using the first letter of the three genera as LPP. Thereafter, several serological strains of LPP were isolated and named as LPP-1, LPP-2, LPP-3, LPP-4 and LPP-5.

.

An scanning electron photomicrograph of *Synechococcus* Phage S-PM2.

After the discovery of LPP-1, a large number of cyanophages was discovered by the other workers including R.N. Singh and coworkers from Banaras Hindu University, India. Padan and Shilo (1973) reviewed different types of cyanophages.

Morphology of Cyanophages:

Morphology of LPP-1 has been studied in detail as compared to the other cyanophages. The cyanophages differ morphologically as well as in physico-chemical properties.

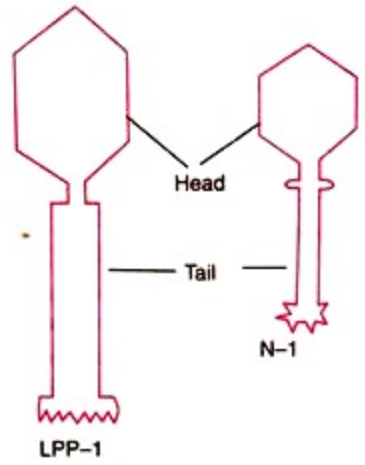

Fig. 18.26 : Diagram of cyanophages.

The LPP-1 group of cyanophages has an icosahedral head and a tail and are similar to T3 and T7 bacteriophages, whereas the N-1 group resembles with T2 and T4 phages.

Groups of Cyanophages

The LPP-1 group of cyanophages has an icosahedral head and a tail and are similar to T3 and T7 bacteriophages,

N-1 group re-sembles with T2 and T4 phages. Like T-even phages the tail may be contractile or non-contractile. In some groups the tail is absent.

AS-1 group has the largest cyanophages.

The group G-III and D-1 are serologically related but do not show any relationship with T-phages.

Cyanophage Group	**Structure**	**BGA host**
LPP group	**LPP1-5, Icosahedral short non-contractile tail**	**Lyngbya, Plectonema, Phormidium**

G-III	**Long Tailed**	**Plectonema (1967.Dr RN Singh , BHU, India)**
N- Group	**C-1, AR-1, Icosahedral contractile long tail**	**Nostoc, Raphidiopsis**
SM group	**AS-1, Hexgonal, contractile Tail**	**Synechococcus, Anacystis**
SM group	**SM1- Icosahedral tailess**	**Synechococcus, Microcystis**

Growth Cycle of Cyanophages:

LPP-1 is adsorbed on host surface and the DNA is injected into the host cell leaving the protein coat outside the cell wall.

Soon after injection of the genome the rate of protein synthesis is reduced and gradually blocked at the end of 5 hour of injection.

The phage multiplies in the invaginated photosynthetic lamellae or in virogenic stroma.

After injection the following three types of proteins are formed:

(i) The earliest proteins soon after injection upto 4th hour,

(ii) Earlier proteins after two hours of injection to completion of lysis,

(iii) Late proteins or structural proteins after 4th hour to host lysis

Significance

Waste stabilization ponds, eutrophic lakes and polluted water support the luxuriant growth of cyanobacteria. These can be obnoxious bloom in water reservoirs like lakes and result in fish mortality. Therefore, the cyanophages

can play a significant role in control of blooms. So far the problems with them are that they are specific to genus and difficult to isolate.

Reference

http://www.biologydiscussion.com/viruses/cyanophages-morphology-and-growth-cycle-microbiology/65895

https://mmbr.asm.org/content/37/3/343.full.pdf