

Mycoplasma Like Organisms or Pleuro Pneumonia Like Organisms (PPLO)

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ABSTRACT

Mycoplasma like Organisms is the smallest of microorganisms causing plant disease. Viruses are acutely small (they can be seen only with the aid of an electron microscope), being composed of nothing more than a protein shell consisting a small amount of genetic material. Plant viruses commonly survive year-round in perennial weeds and trees or insect vectors, and are transmitted to other plants via feeding activities of certain insects, usually aphids, through grafting and by mechanical means. Mycoplasma-like organisms (mycoplasmas, spiroplasmas and rickettsias) are usually considered to be somewhere between bacteria and viruses in size, shape and function. These organisms are the cause of 'yellows' type diseases and are transmitted to plants during leafhopper feeding. Mosaic is characterized by a light green to yellow leaf mottling, usually accompanied by abnormal leaf growth. Vein banding is marked as a light green to yellow band around the leaf veins which may become dark with time. Ring spot forms rings of light green to yellow alternating bands with the normal green of the leaf. Stunting usually accompanies with all of the previous symptoms. Some virus diseases do not show any visible symptoms other than a yield reduction. Many virus and mycoplasma diseases are transmitted from one plant to another by insects, some are transmitted by grafting and others are transmitted by mechanical means. These diseases are found to be difficult to control. Some are controlled by resistant varieties, by using of virus free seed or planting stock, eradicating the alternate host and by controlling the insects that transmit the diseases.

Keywords: *Mycoplasma*-like organisms, prokaryotic, ring spot

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INTRODUCTION

Mycoplasmas are the smallest, wallless, free living microorganisms, and cause disease similar to viruses in plants. The structure of this pathogen was found in 1967 by utilizing electron microscope. *Mycoplasmas* like bodies have additionally been recognized in electron micro graphs of plants suffering from corn. Stunt and aster yellow “*Mycoplasma* is smallest, free living organisms, wallless, prokaryotic organism without an organized and bounded nucleus.” *Mycoplasma* need lack rigid cell wall, being encompassed just by single tripla layered unit membrane which

permits them to be exceedingly plemorphic. They expect endless cluster of shapes and size. They require sterols (lipoproteins) for development *Mycoplasma* can't be developed on artificial media and they repeat by budding and binary fissions.

Taxonomy

Mycoplasma like life forms are incorporated into class: Mollicutes which has one request: *Mycoplasmatales*. The request has three families, every family containing one sort.

1. Mycoplasmataceae: One genus
Mycoplasma.
2. Acholeplamataceae: One genus
Acholeoplasma.
3. Spiroplasmataceae: One genus
Spiroplasma.

These genera are isolated on the premise of their sterol prerequisite for development.

Characteristics of *Mycoplasma* like Organisms (MLOs)

1. MLOs lack true cell wall and capacity to synthesize the substances required to form a cell wall.
2. MLOs are surrounded only by a single triple layered unit membrane.
3. They are small, sometime ultra-microscopic cell mainly consist of micro cytoplasm, randomly dispersed ribosome and strands of nuclear material.
4. They measure from 175 to 250 nm in diameter during reproduction but grow into different shapes and size lateron.
5. Shapes range from coccid or slightly ovoid to filamentous, sometimes, they formed branched myceloid structure.
6. They are adequate of reproduce by budding and binary transverse fission cell.
7. MLOs have no flagella; they do not produce any spore and are gram negative.
8. Nearly all MLOs are parasitic to humans and animals and all saprophytic. They are grown on artificial nutrient media in which they produce minute, colonies, that commonly have a characteristic “fried egg” appearance.
9. MLOs have been isolated frequently from healthy and diseased animals and human suffering from the disease of respiratory and urogenital tracts (associated with arthritic and nervous disorder of animals) [1–3].
10. Most MLOs are mostly resistance to penicillin, but they are sensitive to

tetracyclic, chloramphenicol, some to erythromycin and to certain other antibiotics.

Mycoplasma like Organism of Plant

1. The organism observed in plants and insect vector with the exception of Spiro plasma, simulate the mycoplasmas of the genera, *Mycoplasma* in all morphological aspects (lack cell wall bounded by cell membrane have cytoplasm ribosomes and strands of nuclear material. Their shape is commonly spherical to avoid or irregularly tubular to filamentous and their sizes equal to those of the typical *Mycoplasma*.

- a) Plant *Mycoplasma* like organism is largely present in the sap of a small number of phloem sieve tubes.
- b) In most plant *Mycoplasma* like organisms is transmitted from one plant to another plant by leaf hopper but, some are transmitted by psyllids and plant hoppers.
- c) Plant *Mycoplasma* like bodies also grows up in the alimentary panels, hemolymph salivary glands and intracellularly in the various organs of the body of their insect vectors.
- d) The vector cannot transmit the *Mycoplasma*, rapidly after feeding on infected plants, but it begins to transmit the *Mycoplasma*, directly after feeding on depending upon the temperature. Shorter incubation period occurs at 30 °C whereas, longest at about 10 °C.

The incubation period is needed for multiplication and distribution of the *Mycoplasmas* within the insect. If *Mycoplasma* is captured from the plant, it multiplies first in the intestinal cells of vector, it then passes through the hemolymph and internal organs are infected [4, 5]. When the concentration of mycoplasmas in salivary glands reaches to a certain level, the insect transmits the pathogen to new plant and continuous to do so for the rest of its life.

MLOs are usually be collected readily or better by nymph than adult hopper and survive through consecutive molts, but are not passed on the adult to the egg and to next generation.

Symptoms Produced by *Mycoplasma* like Organisms (MLOs) in Plants

1. *Mycoplasma* like bodies are now stated to be occur in more than 60 to 70 plant disease, which are characterized by the growth abnormalities and yellowing of leaves.
2. Characteristic symptom of yellow type disease comprise uniform yellowing or reddening of leaves, smaller leaves, shortening of internodes, stunting of plants and proliferation of auxiliary bud.
3. "Witch brooms" consist reduction of leaf size with leaves becomes brittle, excessive proliferation of shoots [6].
4. "Phyllody" replacement of floral parts of leaves greening or sterility of flowers and reduced yield. It becomes more or less rapid dieback, decline and disorder after several years.
5. MLOs are mostly restricted to phloem tissue and they may provide favorable conditions for growth as phloem elements have a high osmotic pressure and slightly alkaline PH.

Transmission of *Mycoplasma* like Organisms (MLOs)

1. MLOs are found solely in phloem tissue of infected plants and require a vector for their dispersal.
2. A majority of MLOs are transmitted by leaf hopper, tree hoppers, plant hopper, aphids, and mites also play a vital role in transmission of MLOs.
3. The vector acquires the MLOs while feeding on contaminated phloem. Incubation period ranges from 10 to 45 days depending upon the temperature. During this period MLOs multiply in the body organs of vectors particularly in the salivary glands and hemolymph.

4. MLOs are not passed upon the eggs of contaminated insects.
5. In addition to vectors, MLOs are also transmitted by grafting and by the plant parasite like dodder.

Disease Caused by *Mycoplasma* like Organisms (MLOs)

1. Aster yellow
2. Lethal yellowing of coconut
3. Elm phloem necrosis (Elm yellow)
4. Peach (X-disease)
5. Pear decline
6. Citrus stubborn
7. Corn stunt
8. Sandle spike
9. Citrus greening
10. Seesamum phyllody
11. Grassy shoot of sugarcane
12. Little leaf of brinjal
13. Rice yellow dwarf

General Control Measures of *Mycoplasma* like Organisms

1. Most control measures against yellow type of disease are avoided by preventing infections.
2. Use of antibiotics is known to suppress the yellow type disease. The most important and effective antibiotics appear to be chloro-tetracycline, oxy tetracycline and tetracycline with choramphenicol, ledermycin and metha cycline. The application of antibiotics by root dip or paste under the bark, standing cutting in solution appears to be more effective than foliar spray or soil drenches.
3. Heat Treatment is possible to cure yellow infected plants grassy, shoot of sugarcane by heat treatment [7].
4. Vector Control: As most of diseases are spread by the vector, control of vector through effective insecticides like rogar, Malathion, Endosulphan, demecron, etc.
5. Killing of alternate hosts: Weeds may serve as alternate host, hence killing of alternate host.

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