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Mutual Interaction amongst Leaf Surface - Myco - Organisms of *Curcuma Longa Linn*

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Abstract: *Plants are the sources that are essential for the growth of microbes and are mostly found on the surfaces of the plant parts. Some microbial species are pathogenic and some are non-pathogenic. The result showed that Trichoderma viridae was the strogest fungi. Fusarium oxysoporum,Fusarium solani, Aspergillus niger,Penicillum nigricans, were the Moderate ones. Curvularia lunata,Curvularia clavata, Alternaria alternata and Pestolotia versicolor was the poorest antagonist of all the fungal species.*

Keywords: *Fungi, Curcuma longa, Leaf surface*

1. INTRODUCTION

Surface of the plant are generally populated by a wide variety of micro-organisms e.g. bacteria, fungi and actinomycetes. Some of these microorganisms may be pathogenic and cause infection and may develop disease syndrome. The workers in this field have been much interested in knowing the interrelationship amongst the micro-orgnisms and in between micro-organisms and the leaf surface. Myco- phyllo -flora of a variety of plants have attracted the attention of plant pathologists with a view to explore the ecological interactions between the pathogenic and the saprophytic fungiwith regard to disease interactions (Newhook, 1951, 57; Last 1955; wood and Tveit, 1955; Last and Deightoon, 1965; Leben, 1965; and Sinha, 1965,71).

Leaf surface is the complex biological system, where interesting interactions occur between leaf and microbial flora intimately associate with its leaf systems

Leaf is the best shelter for a wide range of fungi, bacteria, actinomycetes and many other forms of life. Various types of interrelationship exist between different components of the micro-population, which are either mutualistic or antagonistic to one another. Thus the frequency and the activity of one type of organism are influenced by those of others.

Similar associative and antagonistic interactions have been also observed among the inhabitants of that teeming micro-organism, which are present on the surface of the leaves of a green plant. Due to micro-population and intense microbial activities, such antagonistic interactions have been found to be more pronounced in the phylloplane. These interactions among different members of phylloplane myco-population are of considerable importance in maintaining the balance between different organisms.

2. METHODOLOGY

Inter relationship of some common fungi isolated from leaf surface was studied in vitro on agar culture plates with references to their antagonistic interaction. Antagonism amongs the fungi has been studied by this method. One antagonist was tested against several test organisms simultaneously. In this method the antagonist was inoculated in the centre of the plates and the test organism were inoculated in four directions, all around the antagonist at time.

3. OBSERVATION AND RESULT

During the present investigations, therefore, interaction between more common and dominant fungi, were studied in vitro on agar plates. Common and dominant leaf suface fungi which showed antagonistic potentialities were selected as potential antagonists. These organisms were tested for antagonistic activity against several test organisms selected at random.

Antagonism between the antagonist and a test organism was measured in terms of zone of inhibition between the colonies of the two. The degree of antagonism was categorized into the following six grades as suggested by Buxon.(1960)

S.No	Growth of test organism	Category of Antagonism	Symbol used
01	Test organism grew without hindrance over the antagonist.	0	1-
02	Test organism grew well but not over it.	1	+
03	Growth of the test organism slightly affected; only a few hyphae of test organism grew towards the antagonist, leaving the main mycelium .	2	++
04	Growth of test organism hindered inhibition zone 2-3 mm wide.	3	+++
05	Mycelium of test organism stopped on a well defined margin about 5mm away from the antagonist.	4	++++
06	Pronounced inhibition of the test organism. Margin of the mycelium Stopping sharply about I cm away from the antagonist.	5	+++++

During the course of this investigation nine different fungi were tested for their antagonistic against twelve fungi these are *Fusarium solani, Fusarium oxysoporum, Alternaria alternata, Curvularialunata, Curvularia clavata, Pastolotia versicolor, Penicillium nigricans, Trichoderma viridae and Aspergillus niger* were fast growing ones.

Among the twelve test fungi these were *Nigrospora oryzae, Paecilomyces varioti Alternaria tenuis, Cladosporium cladosporioides, Fusarium monliformae, Helminthosporium australiense, Memnoniella echinulata, Cheatomium globosum, Bispora pusiella, Stenella araguata, Phoma glomerata, Alternaria chlamydospora* were the fast growing fungi.

Table No. (1) showed that *Fusarium solani and Trichoderma viridae* is the most effective antagonistic fungi inhibiting the growth of all test organism (fungi) and exhibiting the antagonism sixth order, category fifth except only two fungi *Fusarium monliformae* and *paecilomyces varioti* exhibited antagonism category three.

Table No.01

Interaction of some leaf surface *Mycoorganisms* of *CURCUMA LONGA* plant

Antagonistic Fungi	Test Organi sms											
	Nigrospora oryzae	Paecilomyces varioti	Alternaria alternata	Cladosporium cladosporioides	Fusarium monliformae	Helminthosporium australiense	Memnoniella echnulata	Chetomium globosum	Bispora pusiella	Stenella araguata	Phoma glomerata	Alternaria chlamydospora
*Fusarium solani_*	+++++	+++++	+++++	+++++	+++	+++++	+++++	+++++	+++++	+++++	+++++	+++++
Fusarium oxysoporum	+++++	+++++	+++++	+++++	+++	+++++	+++++	+++++	+++++	+++++	+++++	+++++
Alternaria alternata	+++	+++	+++	+++++	l-	+++	+++	+++++	+++	+++	+++++	+++
Curvularia lunata	+++	+++	+++	+++++	l-	+++	++++	+++++	+++	++++	++++	l-
Penicillum nigricans	+++	+++	+++	+++++	+++	+++++	+++++	+++++	+++++	+++	+++	+++
pestolotia versicolor	+++	+++	+++	+++	+++	l-	+	+++	+++	+++	+++	l-
Trichoderma viridae	+++++	+++++	+++++	+++++	+++++	++++	+++++	+++++	+++++	+++++	+++++	+++++
Aspergillus niger	+++++	+++++	+++++	+++++	+++++	+++	+++	+++++	+++	+++	++++	+++
Curvularia clavata	l-	l-	l-	+++	+++	+++	++	++	l-	+++++	+++++	+++++

Fusarium oxysoporum also show most effective antagonistic behaviour as it inhibited the growth of all test fungi exhibiting antagonism sixth order, fifth category except the fungi, *Fusarium monliformae* It exhibited antagonism against the *Fusarium moniliformae catedgory* three.

Alternaria alternata not most effective antagonistic fungi inhibiting the growth of *Cladosporium cladosporioides, Chetoium globosum, Phoma glomerata,* and exhibiting antagonism sixth order fifth

category. It is against the rest of all test fungi exhibiting antagonism category third except *Fusarium monliformae it exhibits antagonism against the Fusarium monliformae was order one category zero.*

Curvularia lunata exhibited antagonism against two fungi *Fusarium monliformae* and *Alternaria chlamydospora* which comes under group one zero category. Rest of all test fungi exhibited antagonism group four and category three.

Curvularia clavata could not inhibit the growth of any of the test organisms. Thus it exhibited antagonism of zero category against *Nigrospora oryzae Paecilomyces varioti, Alternaria tenuis andBispora pusiella*. It exhibited antagonism the rest of test fungi under category two.

Penicillum nigricans an effective antagonistic fungi inhibiting the growth of *Nigrospora oryzea,Fusarium monliformae, Stenella aragutata, Phoma glomerata, Alternaria chlamydospora* under the category three. It also exhibited the antagonism under the category five against the rest of all test fungi.

Trichoderma viridae has most powerful antagonistic property that exhibited the antagonism category, five against all the test organisms.

Pestolotia versicolor could not inhibit the growth of *Helminthosporium australiense,Memnoniella echinulata, Alternaria chlamydospora* exhibits the antagonism category zero. It also exhibit antagonism under category three against the rest of all test fungi.

Aspergillus niger an effective antagonistic fungi inhibited the growth of Helminthosporium australiense, Memnoniella echinulata, Bispora pusiella,

Stenella araguata, Aternaria chlamydospora, and exhibits antagonism category three. It exhibited antagonism category fifth against the rest of all test fungi.

The result showed that Trichoderma viridae was the strogest fungi *Fusarium oxysoporum,Fusarium solani, Aspergillus niger,Penicillum nigricans,* were the Moderate ones *Curvularia lunata,Curvularia clavata,* Alternaria alternata and Pestolotia versicolor was the poorest antagonist of all.

It may therefore be inferred that among the leaf surface fungi antagonistic one inhibited growth of the rest of the other fungi present thus forbidding them from harming the host. This gives a clue to the role of the leaf surface fungi in biological control of disease.

4. CONCLUSION

Study of the interrelationships of leaf surface mycoflora with particular emphasis on antagonistic interaction indicated different kinds of interrelationship between the myco-organisms belonging to same or different groups. Such an analogous behavior of these fungal species in vitro may give an idea belonging to diverse groups and may resort to a common contrivance in competing with other microbes for the same or closely related ecological niches.

In present investigations nine different fungi were tested for their antagonistic action against several test fungi, The most promising antagonistic against the test fungi was Trichoderma viridae. The growth of all test fungi was checked in the presence of Trichoderma viridae. Other fungi wich were antagonistic to test fungi include *Fusarium solani, Fusarium oxysoporum, Alternaria alternata Curvularialunata, Curvularia clavata, Penicillum nigricans, Aspergillus niger.* Heuvel (1971)demonstrated the presence of *Alternaria tennuissima* (saprophyte) on Phaseolus leaf which inhibited the pathogenic species *Alternaria zinniae.* pugh and Buckley (1971)noticed that on the leaves of Sycamore, *Aureobasidium pullulans* grew actively till the population of *Cladosporium* and Epicoccum was not high. Bier (1966) reported that development of *Melamospora occidentalis* on needles of Pinus trichocarpa could be inhibited by *Trichoderma and Epicoccum* .

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