International Research Journal of Biological Sciences _____ ISSN 2278-3202
Vol. **2(7),** 64-66, July **(2013)** *Int. Res. J. Biological Sci.*

Short Communication

Incidence of Mycoflora on Garlic (*Allium Sativum* L.) Bulbs

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Available online at: www.isca.in
Received 27th April 2013, revised 10th May 2013, accepted 7th June 2013

Abstract

Garlic (Allium Sativum L.) bulbs of soft neck garlic varieties like silver white and silver rose were studied for incidene of mycoflora in fields as well as storages because bulbs are extensively damaged in fields and storages due to various fungal pathogens. Dilution plate method and humid chamber methods were used for isolation of fungi. In all fourteen fungal species were isolated from bulbs. Studies reveals that fungi like Altarnaria porri, Stemphylium botryosum, Cladosporium alli, Helmenthosporium alli, Colletotrichum circinance and Curvularia lunata show high incidence on the bulbs from fields where as fungi like Aspergillus niger, Fusarium oxysporum, Macrophomina Phaseolina, Botrytis alli, Penicillium corymbiferum, Aspergillus flavus, Rhizopus stolonifer, Chaetomium globosum are specially found on bulbs from storage. It is also evident that silver white variety harbors maximum fungal species. Fungi like Colletotrichum circinance, macrophomina phaseolina, and Botrytis alli are not found on the silver rose variety

Keywords: Garlic, mycoflora, silver white, silver rose.

Introduction

Garlic (*Allium sativum* L.) is a most important bulb crop grown under irrigated conditions in india. The bulbs in particular are affected by association of number of fungal pathogens both in fields and storages. The bulbs due to handling, cultivation practices and ill storage are infected severely by number of fungal pathogens. Due to association of these fungi it has been also found that the bulbs are significantly damaged and destroyed resulting in bulb rot and bulb necrosis. The present study deals with isolation and identification of fungi associated with garlic bulbs from fields and storages. For the study bulbs were collected from different garlic growing areas and markets from Maharashtra specially from Marathwada, Kolhapur, Nasik, and Niphad. The bulbs were collected at different ages from the fields. The varieties used were soft neck garlic varieties like silver white and silver rose. The bulb mycoflora is variable both qualitatively and quantitatively from bulbs of fields and storages.

Material and Methods

For the isolation of mycoflora associated with the garlic bulbs the samples were collected from various market places and fields of Maharashtra. The bulbs with different types of abnormalities, discolorations, and having different smells were placed separately in plastic bags and brought to laboratory. Preliminary observations were made by preparing slides of fungal parts seen on bulbs and observing them under microscope.

For isolation of fungi humid chamber and dilution plate method were used[1]. The dilution plate method includes shaking of garlic bulbs in sterile distilled water. Then series of dilutions were made and from dilution flasks 1ml. sample was placed in petridishes and dispersed with melted but potato dextrose agar medium by shaking and rotating the plates before agar solidifies. To reduce growth of bacteria and actinomycetes mediunm was adjusted to pH 4.0 to 4.5 approximately with sulphuric acid[1]. These plates were incubated at room temp. for a week. Colonies appeared were isolated and identified by standard literature. Similarly isolation was also done by humid chamber method in which bulbs were kept in a humid chamber in which humidity was maintained by using moist blotters. This chamber was kept at room temp. for a week. The growth appeared on the bulbs was isolated and identified.

Results and Discussion

From the table it is clear that the garlic bulb mycoflora from silver white and silver rose varieties is significantly variable quantitatively and qualitatively from fields and storages. In particular the percent incidence of the fungi like *Altarnaria porri*, *Stemphylium botryosum, Cladosporium alli, Helmenthosporium alli, Colletotrichum circinance* and *Curvularia lunata* is at greater extent on bulbs from fields where as from the storages the percent incidence of *Aspergillus niger, Fusarium oxysporum, Macrophomina Phaseolina, Botrytis alli, Penicillium corymbiferum, Aspergillus flavus, Rhizopus stolonifer, Chaetomium globosum* is significant. Some fungal species like *Colletotrichum circinance* and *Curvularia lunata* do not grow during storages on bulbs.silver rose variety show resistance to *Colletotrichum circinance Macrophomina Phaseolina, Botrytis alli, Curvularia lunata* and *Chaetomium globosum.* from table it also clear that saprophytic fungi like

Aspergillus spp. Rhizopu stolonifer, penicillium corymbiferum etc.grow more luxuriantly on bulbs in storages than fields.

From observations and results it is clear that garlic bulbs were associated with various fungi in fields and storages. Incidence of fungi on bulbs from fields found was of *Aspergillus niger, Curvularia lunata* and *Alternaria porri* which was also recorded by Rai *et-al*[2], and Auchet et-al[3]. A very important conclusion that *Aspergillus niger* can be transferred from rhizosphere to the storage in case of bulb plants is made by pandey *et-al*[4] in 1986. In present study reports of *Penicillium corymbiferum, Botrytis alli* and *Fusarium oxysporum,*were found from storsges which was previously recorded by Leguizamon *et-al*[5]. Georgieia *et-al*[6] studied that *Fusarium oxysporum, Penicillium corymbiferum,* and *Helmenthosporium alli* cause severe infections during storages resulting into bulb rotting which is confirmed in present studies by their associations with bulbs in storages. Similar results were also found by Chantarasnit *et-al*[7]. An association of fungi like *Helmenthosporium alli* and pathogenicity to pink garlic (silver rose) variety was confirmed by Sanzin[8], which is same as the results of this studies. A garlic cloves decay is due to the penicillium spp, was reported by Brammall[9] which correlates with the present study.

Table-1
Incidence of Mycoflora on garlic bulbs

Sr. No	fungi	Bulb varieties from fields		Bulb varieties from storages	
		Silver white	Silver rose	Silver white	Silver rose
		% incidence of fungi			
1	*Alternaria porri*	15	05	10	-
2	*Aspergillus niger*	80	60	90	90
3	*Fusarium oxysporum*	10	10	40	20
4	*Stemphylium botryosum*	40	10	30	-
5	*Cladosporium alli*	30	10	20	10
6	*Colletotrichum circinance*	10	-	-	-
7	*Macrophomina phaseolina*	20	-	30	-
8	*Botrytis alli*	10	-	20	-
9	*Helminthosporium alli*	20	10	10	20
10	*Penicillium corymbiferum*	70	68	90	79
11	*Aspergillus flavus*	21	29	63	93
12	*Rhizopus stolonifer*	48	46	71	88
13	*Curvularia lunata*	27	21	-	-
14	*Chaetomium globosum*	10	-	30	42
15	Sterile hyphae	20	10	35	44

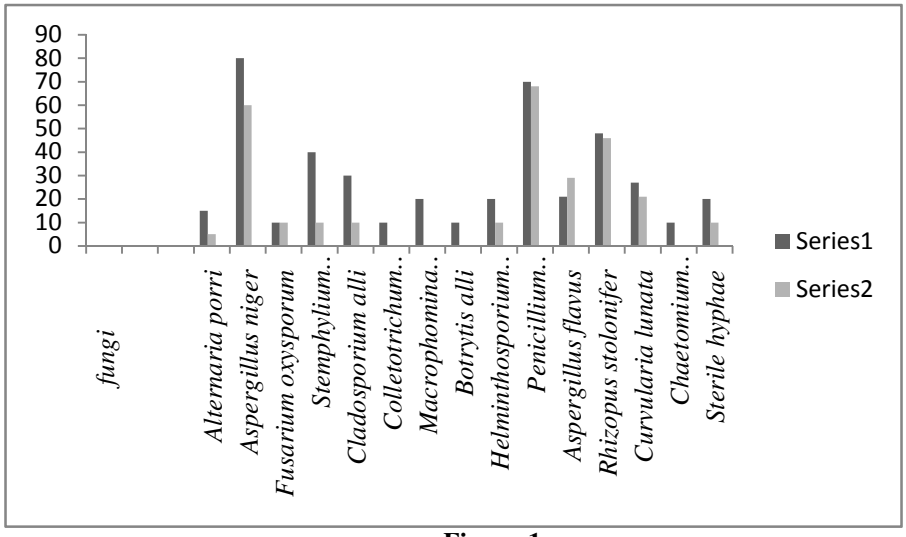

Figure-1
Incidence of garlic bulb fungi from fields on silver white and silver rose varieties

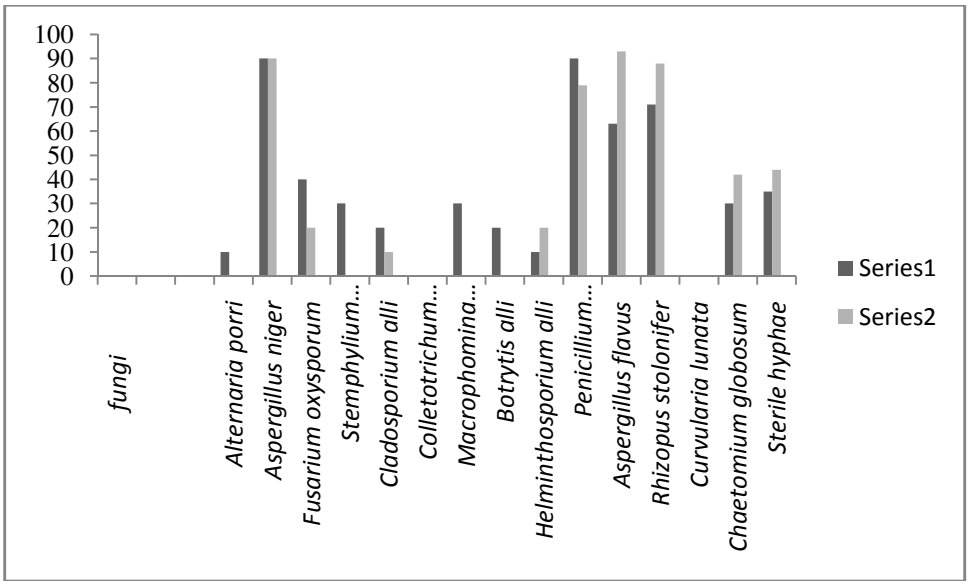

Figure-2
Incidence of garlic bulb fungi from storages in silver white and silver rose varieties

Conclusion

Present study was carried out to determine the incidence of mycoflora onon garlic bulbs during storages and fields from two soft neck garlic varieties like silver white and silver rose. In all 14 fungal species were isolated from fields 12 fungal species from storages. in particular fungi like *Altarnaria porri, Stemphylium botryosum, Cladosporium alli, Helmenthosporium alli, Colletotrichum circinance and Curvularia lunata show high incidence on the bulbs from fields where as fungi like Aspergillus niger, Fusarium oxysporum, Macrophomina Phaseolina, Botrytis alli, Penicillium corymbiferum, Aspergillus flavus, Rhizopus stolonifer, Chaetomium globosum are specially found on bulbs from storage* with high incidence. It also reveals that silver white variety harbor more fungi with high percentage showing its susceptibility towards fungal infections. Fungi like *Colletotrichum circinance, macrophomina phaseolina, and Botrytis alli were not found on the silver rose variety.*

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