



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(12): 4904-4906
© 2022 TPI
www.thepharmajournal.com
Received: 10-10-2022
Accepted: 15-11-2022

TS Godhavale

Department of Plant Pathology,
College of Agriculture, Parbhani
Vasantrao Naik Marathwada
Krishi Vidyapeeth, Parbhani,
Maharashtra, India

CV Ambadkar

Department of Plant Pathology,
College of Agriculture, Parbhani
Vasantrao Naik Marathwada
Krishi Vidyapeeth, Parbhani,
Maharashtra, India

AD Lokhande

Department of Plant Pathology,
College of Agriculture, Parbhani
Vasantrao Naik Marathwada
Krishi Vidyapeeth, Parbhani,
Maharashtra, India

RS Chandurkar

Department of Plant Pathology,
College of Agriculture, Parbhani
Vasantrao Naik Marathwada
Krishi Vidyapeeth, Parbhani,
Maharashtra, India

Evaluation of different bioagents against *Ganoderma* spp. causing basal stem rot disease of Gulmohar

TS Godhavale, CV Ambadkar, AD Lokhande and RS Chandurkar

Abstract

Ganoderma species are important wood decaying fungi distributed throughout the world. They are diverse in the tropics affecting plantation crops such as coconut, arecanut and oil palm and they also affect ornamental, forest and avenue trees in tropical and temperate areas causing Basal Stem Rot/*Ganoderma* wilt. In present study, the *Ganoderma* spp. was isolated from basal stem rot disease of Gulmohar and different bio control agents viz., *Trichoderma asperellum*, *T. Harzianum*, *T. Virens*, *Paecilomyces lilacinus*, *Metarrhizium anisopliae*, *Verticillium lecanii*, *Aspergillus Niger* were tested *in vitro* against *Ganoderma* spp. Among these bioagents, highest mycelial growth inhibition of test pathogen was obtained with *Trichoderma asperellum* (50.74%) over untreated control which was followed by *Trichoderma harzianum* (47.03%), *Trichoderma virens* (41.48%), *Aspergillus Niger* (36.99%) and *Paecilomyces lilacinus* (17.40%), whereas, *Metarrhizium anisopliae* (15.92%) and *Verticillium licani* (14.07%) were found less effective against *Ganoderma* spp.

Keywords: *Ganoderma*, *trichoderma*, bioagents, basal stem rot

Introduction

The disease Basal Stem Rot caused by *Ganoderma* spp. is reported from various places all over the tropical world viz., India, Shrilanka, West Indies, Seycheles, Guam etc. Though the disease was first recorded by Dr. Butler in the beginning of 20th century and later by Venkatanarayan (1936) [4] from Karnataka, a severe outbreak occurred in 1652 in Thanjavur district of Tamil Nadu, and hence named as Thanjavur wilt. The disease also reported from Andhra Pradesh, Kerala, Maharashtra, Gujrat and Orrisa (Bhaskaran *et al.*, 1994; Wilson *et al.*, 1987) [1, 6]. They are diverse in the tropics affecting plantation crops such as coconut, arecanut and oil palm and they also affect ornamental, forest and avenue trees in tropical and temperate areas causing Basal Stem Rot/*Ganoderma* wilt. BSR is like a cancer in several plantation crops, and it is very difficult to detect at the early stages of the disease. Presently several road side plantations including Gulmohar trees as well as ornamental crops are found to be affected by *Ganoderma* spp. which later on turned into partial or complete wilting of the plants. As biological control of plant diseases is the demand of day, the present investigation was undertaken with considering this objective of biological control and therefore efficacy of different bioagents were tested *in vitro* against *Ganoderma* spp.

Material and Methods

The dual culture technique was used to test the antifungal activity of different bioagents against *Ganoderma* spp. The pathogen and bioagents were grown on different media for a week at 25±2 °C. 5mm disc of the target fungi cut from the periphery was transferred to the Petri dish previously poured with sterilized Potato Dextrose Agar media. Bioagents were transferred aseptically in the same plate at opposite end and were incubated at room temperature with alternate light and darkness for 7 days and observed periodically. Control plate was also maintained without bioagents.

Efficacy of bioagents on mycelial growth (mm) of Pathogens

Design	:	CRD
Treatment	:	Eight
Replication	:	Three

Corresponding Author:

TS Godhavale

Department of Plant Pathology,
College of Agriculture, Parbhani
Vasantrao Naik Marathwada
Krishi Vidyapeeth, Parbhani,
Maharashtra, India

Treatment details**Treatment Bioagent**

T ₁	<i>Trichoderma asperellum</i>
T ₂	<i>Trichoderma harzianum</i>
T ₃	<i>Trichoderma virens</i>
T ₄	<i>Paecilomyces lilacinus</i>
T ₅	<i>Metarhizium anisopliae</i>
T ₆	<i>Verticillium lecanii</i>
T ₇	<i>Aspergillus niger</i>
T ₈	Control

Observations on radial mycelial growth/colony diameter of *Ganoderma* spp. was recorded at 24 hours interval and continued till the untreated control plates were fully covered with mycelial growth of the test fungus. Per cent mycelial growth inhibition of the test pathogen with bioagents, over untreated control was calculated by applying following formula given by (Vincent, 1927) ^[5].

$$\text{Per cent inhibition} = \frac{C - T}{C} \times 100$$

Where,

C= Mycelial growth in control plate

T= Mycelial growth in treated plate

Results and Discussion***In vitro* evaluation of bioagents against *Ganoderma* spp.**

The results obtained on mycelial growth and inhibition of *Ganoderma* spp. with seven fungal antagonists are presented in Table 1, Fig.1 and Plate 1. Results revealed that all the bioagents evaluated exhibited fungistatic / antifungal activity against *Ganoderma* spp. and significantly inhibited its growth over untreated control.

Among all the treatments of bioagents, the treatment (T₁) *Trichoderma asperellum* was found most effective and showed 50.74 per cent mycelial inhibition which was followed by Treatment (T₂) *Trichoderma harzianum* with 47.03 per cent inhibition. Both the treatments were statistically significant over control. The next best treatment was found *Trichoderma virens* (T₃) and showed 41.48 per cent inhibition which was followed by *Aspergillus Niger* (T₇) (36.99%) and *Paecilomyces lilacinus* (T₄) (17.40%). The treatment *Metarhizium anisopliae* (T₅) showed 15.92 per cent mycelial inhibition of *Ganoderma* spp. which was followed by treatment *Verticillium lecanii* (T₆) (14.07%). Both treatments were at par with each other and significant with control.

These results are in conformity with the earlier findings of earlier workers. Musa *et al.* (2017) ^[2] studied percentage inhibition growth rate (PIGR) of four *Trichoderma* spp. against *G. Boninense*. The PIGR values ranged from 76.0 to

84.6 per cent, with the maximum percentage inhibition by *T. asperellum* (84.6%) and the least 76.0 per cent inhibition was observed with *T. Brevicompactum*. Sudarshan *et al.* (2017) ^[3] tested seven isolates namely *Trichoderma viridae* (GKVK), *Trichoderma harzianum* (GKVK), *Trichoderma asperellum* (GKVK), *Trichoderma harzianum* (HRS), *Trichoderma harzianum* (NBAIL), *Trichoderma harzianum* (KRN) and *Trichoderma harzianum* (MYS) against *Ganoderma lucidum*. Among these antagonists tested *Trichoderma asperellum* (GKVK) was found superior over all other bio agents by recording maximum inhibition of 76.00 per cent followed by *Trichoderma viride* (GKVK) which recorded 74.89 per cent inhibition. Least inhibition of 61.78 per cent was recorded in treatment of *Trichoderma harzianum* (KRN).

Table 1: *In vitro* efficacy of bioagents against *Ganoderma* spp.

Tr. No.	Treatments	Colony Dia. (mm)	% Inhibition
T ₁	<i>Trichoderma asperellum</i>	44.33	50.74 (45.40)*
T ₂	<i>Trichoderma harzianum</i>	47.66	47.03 (43.28)
T ₃	<i>Trichoderma virens</i>	52.66	41.48 (40.07)
T ₄	<i>Paecilomyces lilacinus</i>	73.00	17.40 (24.56)
T ₅	<i>Metarhizium anisopliae</i>	75.66	15.92 (23.50)
T ₆	<i>Verticillium lecanii</i>	76.66	14.07 (22.01)
T ₇	<i>Aspergillus niger</i>	56.70	36.99 (37.44)
T ₈	Control	90.00	—
S.E. (m) ±		0.38	0.61
C.D. at 1%		1.17	1.85

*Figures in parenthesis are angular transformed value



Plate 1: *In vitro* efficacy of various bio-agents against *Ganoderma* spp.

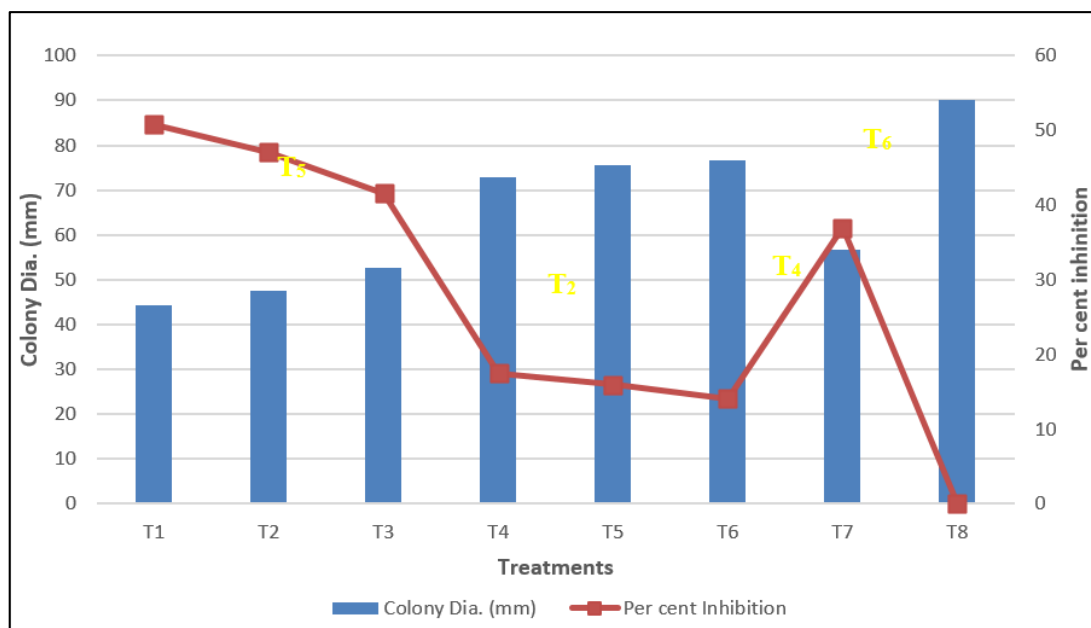


Fig 1: *In vitro* evaluation of different bioagents against *Ganoderma* spp.

Conclusion

From the present study, it can be concluded that *T. asperellum*, *T. harzianum*, *T. virens* can be used for control of *Ganoderma* spp.

References

1. Bhaskaran R, Ramanathan T, Ramiah M. Chemical control of Thanjavur wilt. *Intensive Agriculture*. 1994;20:19-21.
2. Musa H, Hassan MA, Isyaku1 MS, Halidu J, Suleiman1 AS. Antagonistic Potential of *Trichoderma* species against *ganoderma* disease of oil palm. *Nigerian Journal of Agriculture, Food and Environment*. 2017;13(2):60-67.
3. Sudarshan GK, Chandrashekara GS, Manjunath B, Basavaraju TB, Palanna KB. *In vitro* evaluation of botanicals, bio agents and fungicides against basal stem rot of coconut caused by *Ganoderma lucidum*. *New Agriculturist*. 2017;28(1):43-47.
4. Venkatarayan SV. The biology of *Ganoderma lucidum* on arecanut and coconut palms. *Phytopathology*. 1936;26:153-175.
5. Vincent JM. Distortion of fungal hyphae in the presence of certain inhibitors. *Nature*. 1927 Jun;159(4051):850.
6. Wilson KI, Rajan MC Nair, Bhaskaran S. *Ganoderma* disease of coconut in Kerala. International symposium on *Ganoderma* wilt disease on palms and other perennial crops, TNAU, Coimbatore (Abstract); c1987. p. 4-5.