*J. Biol. Control*, 18(1): 103-106, 2004

Research Note

# Screening *Trichoderma* isolates against wilt pathogens of safflower, *Carthamus tinctorius* L.

**A. K. PATIBANDA and R. D. PRASAD[1]**
Acharya N. G. Ranga Agricultural University
Agricultural Research Station
Tandur 501 141, Ranga Reddy District, Andhra Pradesh, India
E-mail: anilpatibanda @yahoo.co.in

**ABSTRACT:** **Four *Trichoderma* isolates were tested for *in vitro* their antagonistic potential against safflower wilt causing pathogens *Fusarium oxysporum* f. sp. *carthami* and *Macrophomina phaseolina*. *Trichoderma viride* (PDBC TV 32) and *T. harzianum* (PDBC TH 10) were effective against both the pathogens. *Trichoderma viride*, isolated from the *Fusarium* wilt sick plot in Tandur was effective only against *M. phaseolina*, while *F. oxysporum* f. sp. *carthami* had inhibitory effect on sporulation of *T. viride*.**

**KEY WORDS:** Antagonism, *Fusarium oxysporum* f. sp. *carthami*, *Macrophomina phaseolina*, *Trichoderma* spp.

Safflower wilts are caused by a number of soilborne plant pathogenic fungi, of which *Fusarium oxysporum* f. sp. *carthami* and *Macrophomina phaseolina* are of utmost importance (Patil, 1987). Being soil borne pathogen, chemical control is neither feasible nor practicable. At this juncture, biological control using antagonistic fungi offers a reliable approach either alone or in integration with other disease management practices. Several bioagents have been tested to manage safflower wilts (Chattopadhyay and Kalpana Sastry, 1997). However, so far no success was attained in getting effective field control using the biocontrol agents (Anonymous, 2001). Hence, a preliminary investigation was undertaken to *in vitro* evaluate five isolates of *Trichoderma* spp. against wilt causing fungi.

The wilt causing fungi, *Fusarium oxysporum* f. sp. *carthami* and *Macrophomina phaseolina* were isolated from Agricultural Research Station, Tandur. Four species of *Trichoderma viz*., *T. viride* (PDBC TV 32), *T. harzianum* (PDBC TH 10), *T. virens* (PDBC TVs 2) and *T. hamatum* (PDBC Tha 2) were obtained from PDBC, Bangalore. One isolate of *T. viride* was isolated from the wilt sick plot at Agricultural Research Station, ANGRAU, Tandur. Dual culture studies were conducted to evaluate the antagonistic activity of *Trichoderma* spp. Appropriate check plates were maintained with either the test pathogen or test antagonist

1. Directorate of Oilseeds Research, Rajendranagar, Hyderabad 500 030

inoculated alone. The plates were incubated for 15days at 28±1°C. Observations were recorded on the radial growth of each test antagonist till the union with the test pathogen growth in dual culture plates.

Overgrowing ability of the test antagonist was classified based on Bell's scale (Bell *et al.*, 1982) as follows:

Class I: The antagonist completely overgrew the pathogen (100% overgrowth)

Class II: The antagonist overgrew 2/3rd of pathogen surface (75% overgrowth)

Class III: The antagonist overgrew 1/2 of pathogen surface (50% overgrowth)

Class IV: The antagonist and pathogen locked at the point of contact

Class V: The pathogen either overgrew the antagonist or showed inhibitory signs on the antagonist

All the test antagonist isolates occupied the entire 9cm diameter Petri-plates in 5 to 6 days of incubation in check plates. *Macrophomina phaseolina* when inoculated alone took 4 days to completely occupy the plate where as *F. oxysporum* f. sp. *carthami* took 11 days to cover entire plate.

In dual culture plates, *T. viride* (PDBC TV 32) and *T. harzianum* (PDBC TH 10) could overgrew on both *M. phaseolina* and *F. oxysporum* f. sp. *carthami* growth completely in 15 days of incubation and hence are categorized under Class I (Table 1). *Trichoderma virens* (PDBC TVs 2) and *T. hamatum* (PDBC Tha 2) were not only less effective against *F. oxysporum* f. sp. *carthami* giving Class II reaction in 15 days of incubation but also failed to overgrew on *M. phaseolina* giving Class IV reaction. The isolate of *T. viride* from *Fusarium* wilt sick plot at Tandur gave Class I interaction only in case of *M. phaseolina* whereas in the case of *F. oxysporum* f. sp. *carthami* the reaction was Class V with *F. oxysporum* f. sp. *carthami* giving signs of inhibiting *T. viride* as evidenced by decreased sporulation in *T. viride* colony at the interaction zone. Vajna (1985) also showed the inhibitory effect of *F. oxysporum* on *Trichoderma* spp.

Thus the present investigation revealed variation in antagonistic potential of different *Trichoderma* spp. against two wilt causing fungi.

**Table1. Effect of *Trichoderma* isolates on *F. oxysporum* f. sp. *carthami* and *M. phaseolina***

| Antagonist | Pathogen | Duration required for point of contact | Bell's Scale (15 days after inoculation) |
|---|---|---|---|
| *T. viride* (PDBC TV 32) | *M. phaseolina*<br>*F. oxysporum* f. sp. *carthami* | 3 days<br>4 days | Class I<br>Class I |
| *T. harzianum* (PDBC TH10) | *M. phaseolina*<br>*F. oxysporum* f. sp. *carthami* | 4 days<br>5 days | Class I<br>Class I |
| *T. virens* (PDBC TVs 2) | *M. phaseolina*<br>*F. oxysporum* f. sp. *carthami* | 4 days<br>4 days | Class IV<br>Class II |
| *T. hamatum* (PDBC Tha 2) | *M. phaseolina*<br>*F. oxysporum* f. sp. *carthami* | 4 days<br>4 days | Class IV<br>Class II |
| *T. viride* (Tandur) | *M. phaseolina*<br>*F. oxysporum* f. sp. *carthami* | 2 days<br>4 days | Class I<br>Class V |

Further, the inefficacy of the native *T. viride* isolate against *F. oxysporum* f. sp. *carthami* and the inhibitory effect of *F. oxysporum* f. sp. *carthami* on native *T. viride* isolate were attributed as reasons for the soil's wilt sickness.

## ACKNOWLEDGEMENTS

The first author is thankful to Acharya N. G. Ranga Agricultural University, Rajendranagar, Hyderabad and to AICRP (O) on Safflower for their assistance.

## REFERENCES

Anonymous, 2001. Annual Progress Report, Safflower, 2001-02, Directorate of Oilseeds Research, Rajendranagar, Hyderabad, 110pp.

Bell, D. K., Wells, H. D. and Markham, C. R. 1982. *In vitro* antagonism of *Trichoderma* species against against six fungal plant pathogens. *Phytopathology*, **72**: 379-382.

Chattopadhyay, C. and Kalpana Sastry, R. 1997. Effect of bioagents on safflower wilt caused by *Fusarium oxysporum* f. sp. *carthami*, pp. 299-302. *Proceedings of IV International Safflower Conference*, Bari, Italy, June 2-7, 1997.

Patil, P. S. 1987. Safflower-AICRP on Oilseeds (Safflower), MPKVV, Solapur, 206 pp.

Vajna, L. 1985. Phytopathogenic *Fusarium oxysporum* Schlecht as a necrotrophic mycoparasite. *Phytopathology Z.*, **114**: 338-347.