INTERNATIONAL JOURNAL OF PLANT PROTECTION | VOLUME 6 | ISSUE 2 | OCTOBER, 2013 | 436-439

IJPP

RESEARCH ARTICLE

Effect of fungicides, plant extracts and bioagents on inhibition of uredospore germination of *Puccinia arachidis* speg.

■ RAHUL R. KALASKAR[1]*, R.L. PARATE[2], P.A. MANE[3] AND C.B. LOMATE[2]

[1]Department of Plant Pathology, Shramshakti College of Agriculture, Maldad, Sangamner, AHMEDNAGAR (M.S.) INDIA
[2]Department of Plant Pathology, College of Agriculture, NAGPUR (M.S.) INDIA
[3]Department of Plant Pathology, D.M. College of Agriculture, RAJMACHI (M.S.) INDIA

ARITCLE INFO

Received : 14.08.2013
Revised : 30.09.2013
Accepted : 06.10.2013

Key **W**ords :
Puccinia arachidis, Fungicides, NSKE, *Trichoderma harzianum, Pseudomonas fluroscens*

***Corresponding author:**

ABSTRACT

The present investigation was undertaken during the *Kharif* season of year 2010-11 at the farm of Plant Pathology Section, college of Agriculture, Nagpur for testing the effect by integrating fungicides, plant extract and bioagents against rust disease (*Puccinia arachidis* Speg.) ofgroundnut. The result of present investigation revealed that all the treatments significantly inhibit uredospore germination. Difenconazole shows maximum inhibition of uredospore germination of rust disease followed by Propiconazole and Hexaconazole. Regarding plant extract and bioagents, NSKE proved better than *Trichoderma harzianum* and *Pseudomonasfluroscens*. Similar results were found in yield parameter also.

How to view point the article : Kalaskar, Rahul R., Parate, R.L., Mane, P.A. and Lomate, C.B. (2013). Effect of fungicides, plant extracts and bioagents on inhibition of uredospore germination of *Puccinia arachidis* speg.. *Internat. J. Plant Protec.*, **6**(2) : 436-439.

INTRODUCTION

Groundnut is 13th most important food crop and 3rd most important source of vegetable protein of the world which is grown is more than 100 counties. Developing countries accounts fr 96% of global groundnut area and 92% of global production. Asia accounts for 58% of the global groundnut area and 67% of the groundnut production with and annual growth rate of 1.28% for area, 2% for production and 0.71% for productivity (consultative group on International Agriculture Research, 2010). Groundnut seed contain high quality edible oil 40-54%, 25% digestible protein and 20% carbohydrates. Groundnut is a rich source of vitamin A, B, B_2, and E, thus recognized as poor man's nut.

Groundnut crop mainly damaged by rust disease which is caused by *Puccinia arachidis* Speg.this causes yield losses up to 50% (Ghuge *et al.*, 1981).

Hence, an attempt was made to study effect of fungicides plant extract and bioagents on inhibition of uredo spore germination of *Puccinia arachidis* Speg. ofgroundnut and pod yield and test weight of groundnut seed at Plant Pathology Section, College of Agriculture, Nagpur during *Kharif* season of year 2010-11.

MATERIALS AND METHODS

Fungicides *viz.*, Propiconazole (Tilt) (25% EC), Hexaconazole (Gilcone) (5% EC), Penconazole (Topas) (10% EC), Difenconazole (Score) (25% EC) and Mancozeb (Indofil) (75% WP) and pure cultures of bioagents, *Trichoderma harzianum* and *Pseudomonas fluroscens* were obtained from Plant Pathology Section, College of Agriculture, Nagpur. Powder of Neem Seed Kernel Extract (NSKE) was procured from Need foundation, Nagpur.

Preparation of fungicidal solution :

Propiconazole, Hexaconazole, Penconazole and Difenconazole are used at 0.1% solution. Mancozeb used as 0.2%.

Preparation of NSKE extract :

500 gm powders of Need Seed Kernel Extract was mixed in 3 liters of water and 10 g adjuvant like soap and kept for overnight, filtered the solution by muslin cloth at morning and made volume of 10 liters that gave 5% concentration of NSKE solution for spraying.

Preparation of bioagents :

Trichoderma harzianum was multiplied on Potato Dextrose Broth and *Pseudomonas fluroscens* was multiplied on King's B Medium broth. Organisms were separated from culture filtrates through filtration and centrifugation. Thereafter, supernatant of individual organism was further diluted to get 0.5 per cent concentration in sterilized water (Nirmalkar and Lakpale, 2007).

Inhibition of uredospore germination :

Experiment was conducted by hanging drop method for recording germination and inhibition of uredospore of *Puccinia arachidis* Speg. by hanging drop method by using cavity slide. Experiment was carried out in randomized block design with three replications.

One drop of fungicides, plant extracts and bioagents of desired concentration was put in a one drop of standard spore suspension separately in a cavity slide. It was incubated at 20 ± 1^0C temperature in BOD incubator. Observations were recorded for germination after 24 hours of incubation. Inhibition of uredospore germination was calculated by following formula :

$$\text{Per cent inhibition of uredospore germination} = \frac{C-T}{C}$$

where,

C = Per cent germination in control

T= Per cent germination in treatment

All standard and recommended packages of practices were followed for *in vivo* experiment and observations were recorded for dry pod yield and test weight of groundnut.

RESULTS AND DISCUSSION

Results from Table 1 and Fig. 1 revealed that all the

Table 1 : Effect of fungicides, plant extract and bioagents on percent inhibition of uredospore germination

	Treatments	Total spore observed	No. of spore germinated	Percentage of germination	Percentage inhibition of uredospore germination over control
T_1	Propiconazole 25% EC @ 0.1%	38	01	3.57	95.2 (79.81)
T_2	Hexaconazole 5 % EC @.01%	57	04	6.92	90.74 (72.23)
T_3	Penconazole10 % EC @ 0.1%	44	05	11.20	84.59 (66.90)
T_4	Difenconazole 25 % EC @0.1%	46	00	00	100 (90.00)
T_5	Mancozeb 75 % WP @ 0.2%	42	03	7.95	79.36 (71.44)
T_6	Neem seed kernel extract @ 5 %	68	31	45.55	39.18 (38.74)
T_7	*Trichoderma harzianum* @ 0.5 %	39	20	51.69	30.99 (33.82)
T_8	*Pseudomonas fluroscens* @ 0.5 %	50	29	58.38	22.32 (28.18)
T_9	Control	53	40	74.91	00 (00)
	F test				Sig.
	SE (m) ±				1.95
	C.D. (P = 0.05)				5.86

(All figures are mean of three replications)
(Figures in parenthesis are arc sin transformed value)

Table 2 : Effect of various treatments on dry pod yield and test weight of ground nut

	Treatments	Dry pod yield (kg/ha)	Test weight (gm)
T_1	Propiconazole 25% EC @ 0.1%	1692	47.53
T_2	Hexaconazole 5 % EC @.01%	1530	45.69
T_3	Penconazole10 % EC @ 0.1%	1407	44.20
T_4	Difenconazole 25 % EC @0.1%	1744	48.80
T_5	Mancozeb 75 % WP @ 0.2%	1292	43.00
T_6	Neem seed kernel extract @ 5 %	1161	41.43
T_7	*Trichoderma harzianum* @ 0.5 %	1075	40.06
T_8	*Pseudomonas fluroscens* @ 0.5 %	977	38.40
T_9	Control	891	35.70
	F test	Sig.	Sig.
	SE (m) ±	17.04	0.86
	C.D. (P = 0.05)	51.10	2.60

treatments significantly inhibit uredospore germination over unsprayed control. Maximum inhibition of uredospore germination was recorded with treatment Difenconazole @ 0.1% (100%), followed by Propiconazole @ 0.1% (95.2%) and Hexaconazole @ 0.1% (90.74%). Similar observations were noted by Nirmalkar and Lakpale (2007) and Zade (2002). Among plant extracts and bioagents, Neem Seed Kernel Extract @ 5% (39.18%) found significantly superior over *Trichoderma harzianum* (30.99%) and *Pseudomonas fluroscens* (22.32%) and both these treatment were at par with each other. Inhibition of uredospore germination were also noted by Govindasamy and Balasubramanian (1989), Nirmalkar and Lakpale (2007) and Zade (2002).

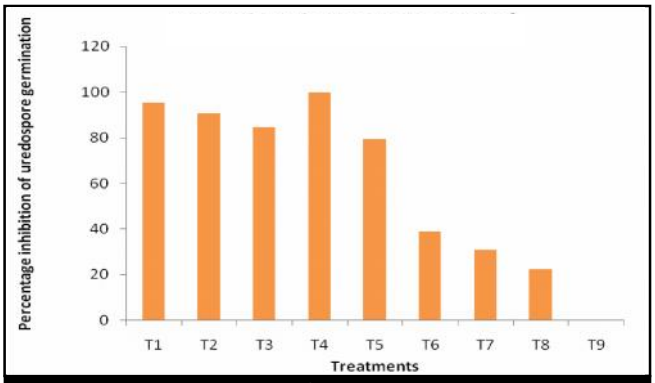

Fig. 1 : Percentage inhibition of uredospore germination over control

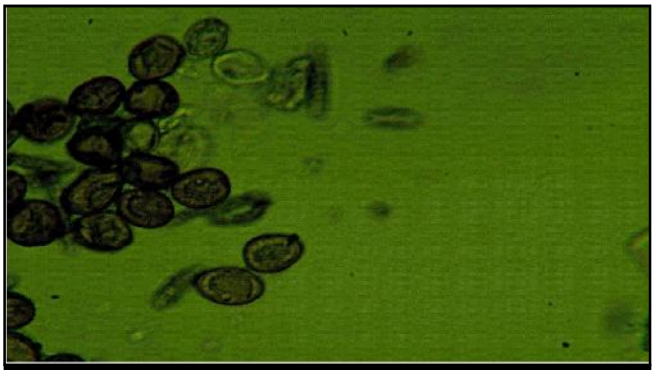

Plate 1 : Uredospore : *Puccinia arachidis*

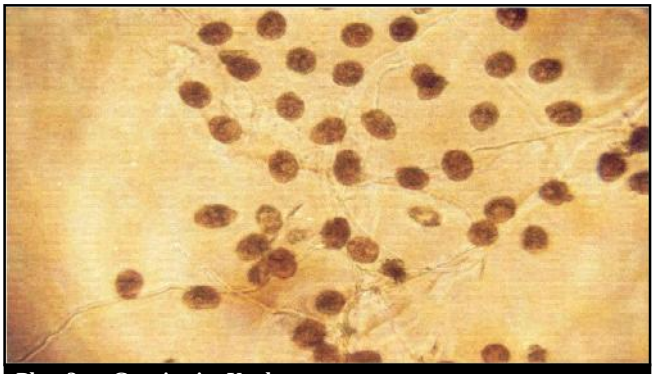

Plate 2 : Germinating Uredospore

The data presented Table 2 revealed that Difenconazole (0.1%) obtained maximum dry pod yield (1744 kg/ha) and test weight (48.80 gm) which found significantly superior over other treatments followed by Propiconazole (1692 kg/ha) and test weight (47.53 g) and Hexaconazole (1530 kg/ha) and test weight (45.69 g). These observations are on the similar line with Jadeja *et. al.* (1999), Tiwari *et al.* (2004) and Johnson and Subramanyam (2003). Among plant extract and bioagents Neem Seed Kernel Extract recorded highest pod yield (1161 kg/ha) and test weight (41.43 gm) followed by *Trichoderma harzianum* (1075 kg/ha) and test weight (40.06 g) and *Pseudomonas fluroscens* (977 kg/ha) and test weight (38.40 g) which was found superior over unsprayed control. These observations are on similar line with Sunkad *et al.* (2005), Kalappanavar *et al.* (2008) and Usman *et al.* (1991).

REFERENCES

Burmeister, L. and Hau, B. (2009). Control of the bean rust fungus *Uromycesappendiculatus*by means of *Trichoderma harzianum*. *Biocontrol*., **54**(4): 575-585.

Das, S. and Raj, S.K. (1993). Assessment of loss due to rust (Puccinia arachidis) in groundnut. *Indian J. Agril Sci.*, **63**(11): 752-753.

Ghuge, S.S., Mayee, C.D. and Godbole, G.M. (1981). Assesment of losses in peanut due to rust and tikka leaf spot.*Indian Phytopathol.*, **34**(2) : 179-182.

Govindasamy, V. and Balasubramanian, R. (1989). Biological control of groundnut rust, *Puccinia arachidis* by *Trichoderma harzianum.Zeitschrift – fur- Pflanzenkrankheiten- und - Pflanzenschutz*, **94**(4) : 337-345.

Jadeja, K. B., Nandolia, D.M., Dhrujand, I.U. and Khandkar, R.R. (1999). Efficacy of four trizole fungicides in the control of leaf spot and rust of groundnut. *Indian Phytopathol*., **52**(4) : 421-422.

Johnson, M. and Subramanyam, K. (2003). Management of groundnut late leaf spot and rust through trizole fungicides. *Annals of Plant Protection Sciences*, **11**(2) : 395-397.

Kalappannavar, I. K., Patidar, R.K. and Kulkarni, S. (2008). Managemen strategies of leaf rust of wheat aused by Puccinia recondita f. Sp. Tritici Rob. Ex. Desm. *Karnataka J. Agric. Sci.*, **21**(1) : 61-64.

Mathivanan, N., Srinivasan, K. and Chelliah, S. (2000). Field evaluation of Trichoderma viridae pers. Ec. S. f. Gray and *Pseudomonas fluroscens* Migula against foliar diseases of groundnut and sunflower. *J. Biological Control*, **14**(1) : 31-34.

Nirmalkar, V. K. and Lokpale, N. (2007). Effect of fungicides, plant extracts and bioagents on uredospore germination and germ tube length of *Uromycesacori*. *J. Mycol. Pl. Pathol*., **37**(2):272-275.

Sunkad, G. and Kulkarni, S. (2006). Assessment of pod and haulm yield losses due to rust of groundnut caused by *Puccinia arachidis Speg.*In northern Karnataka. *Indian Phytopathol.,* **59**(1) : 56-61.

Sunkad, G., Kulkarni, S. and Benagi, V.I. (2005). Effectiveness of Neem Seed Kernel Extract in combination with selected fungicides for groundnut rust management. *International Arachis Newsletter*. No. **7** : 21-23.

Tiwari, R. K. S., Ojha, B.M. and Chandravanshi, S.S. (2004). Efficacy of fungicides in controlling leaf spot (Cercospora arachidicola and Cercosporidium personatum) and rust (Puccinia arachidis) in groundnut. *J. Mycol. Pl. Pathol.*, **34**(2) : 520-521.

Usman, M., Jaganathan, R. and Dinkaran, D. (1991). Plant disease managewment on groundnut with naturally occuring plant product. *Madras Agric. J.*, **78**(1-4) : 152-153.

Zade, S.R. (2002). Evaluation of fungicides, plant extract and culture filtrate of bioagent against *Puccinia arachidis Speg.* M.Sc. Thesis, Dr. Panjabrao Deshumku Krishi Vidyapeeth, Akola, M.S. (INDIA).