

Ecofriendly Management of Wheat Rust by Plant Extracts with Special Reference to Spore Germination

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Abstract: Diseases of plants caused by pathogenic bacteria and fungi are common throughout the world. Due to spread of chemical fungicide, some particles are remained in the soil after that they are included in our food chain and dangerous for health. The immediate result of chemical fungicide on the crop diseases are seen but its side effects is very harmful like air, water and soil pollution. So, that people diverts to use phytofungicide. Chemical fungicide Hexaconazole (0.05%) used as a standard check and distilled water used as a control. 3% aqueous leaf extract of *Clerodendron inerme* at 6 hour incubation period shows better inhibitory effect on spore germination which is 12.74% and 3% aqueous leaf extract of *Ipomoea carnea* in reducing the spore germination up to 14.08%. Selected plants showed better effect on spore germination as compare to control. The results are good site for pathologist that they can work on ecofriendly management of Wheat rust caused by *Puccinia triticina*. One can use such plant extracts for management of Wheat rust.

Keywords: PLANT EXTRACTS, PUCCINIA TRITICINA, SPORE GERMINATION

I. INTRODUCTION

Wheat (*Triticum aestivum* L) is one of the important cereal crop extensively grown all over the world. In Maharashtra it is grown under irrigated conditions. Wheat is occasionally infected by rust. Leaf rust is caused by *Puccinia recondite* f.sp. *tritici* (now known as *Puccinia triticina* Eriks). Leaf rust appears as small circular to oval brown pustules on the upper surface of the leaf. These pustules are scattered across the leaves randomly. Spores develop on leaves and leaf sheaths, they do not form on the upper stem or heads of Wheat plants. Microbial diseases of plants reduce the yield or the survival capability resulting in death. The use of chemicals to control fungal pathogen but due to chemical cause environmental pollution. Many plants have been reported to contain antibacterial and antifungal substances (Grainge *et.al* 1984). Sajid *et.al* (1995) who reported that the neem oil in the field at four percent concentration checked leaf rust on Wheat after four applications.

It is well known that plant extracts are having antifungal activities due to the presence of secondary metabolites. According to De *et.al* (2009) and Lutterodt *et.al*(1999) secondary metabolites play an important role in defense mechanism against microorganisms. Mahammad *et. al* (2001) reported Wheat rust control by leaf extract of poisonous phanerogamic plants.

Therefore the aim of the present investigation is an attempt has been made to find out antifungal activity of plant extract on spore germination of *Puccinia triticina*.

II. MATERIALS AND METHODS

Healthy parts of selected plants like, *Clerodendron inerme* and *Ipomoea carnea* were collected from agricultural fields. About 20 grams of plant parts like root, stem, leaf and flower etc. were weighted and washed with running



water for several times and then weep with blotting paper. They were crushed in a mortar and pestle with 20ml distilled water. The extract was filtered through four layered muslin cloth and filtrate was then passed through whatman's filter paper no.3. Filtrate was centrifuged at 1600 rpm for five minutes. This filtrate was considered as stock solution and then made up 1%, 2% and 3% concentrations by adding distilled water.

All the experiments were laid under laboratory conditions. The effect of plant extract on fungal spore germination was studied on slide. For this taken single drop of different concentrations of plant extract on different slides. Fresh spores collected from single pustule with the help of dissecting needle were placed in the drop of plant extract. All the slides were kept on moist blotting paper in petri plates to maintain humidity for 6 hour, 12 hour and 24 hour respectively. Percentage of spore germination was calculated and the germination effects were recorded. Counted the total number of spores and germinated spores under the single field of microscope (10 ×45). Mean of three observations were considered as replication I. Same was considered for replication II & III. The figures noted in observation table are the mean of three replications.

III. RESULT AND DISCUSSION

Aqueous plant extracts was tested against spore germination of *Puccinia triticina*. The Data was analysed and tabulated. The treatment with 0.05% Hexaconazole found to be superior over all other treatments showed 0% spore germination. Aqueous leaf extract of *Clerodendron inerme* showed better retardance of spore germination i.e 12.74%, 14.98% and 17.45% germination. 14.81%, 17.17% and 19.15% germination found in aqueous leaf extract of *Impomoea carnea* when observation were recorded at 6,12 and 24 hour incubation period in 3% concentration. The treatment with plant extracts showed better effect over the control.

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Table- Effect of different plant extracts on spore germination % of *Puccinia triticina* Eriks after various incubation period.

Tr.No.	Name of the plant	Plant part used	Cocentrations of extract								
			1%			2%			3%		
			Observations after incubation period								
			6h	12h	24h	6h	12h	24h	6h	12h	24h
T1	<i>Ipomoea carnea</i> Jacq.	Root	42.33	43.46	47.23	35.93	36.81	38.74	27.47	33.94	34.29
T2		Stem	36.2	38.05	45.93	33.15	35.00	35.46	24.53	25.00	31.95
T3		Leaf	24.15	25.63	38.33	20.5	22.4	23.33	14.81	17.17	19.15
T4		Flower	36.95	37.05	40.22	29.44	31.03	33.71	23.93	28.62	29.17
T5	<i>Clerodendron inerme</i> Gartn.	Root	36.95	43.34	48.15	26.58	33.34	33.98	19.21	19.23	20.36
T6		Stem	35.00	35.96	39.16	27.66	31.49	33.99	19.64	21.44	25.19
T7		Leaf	34.39	38.09	41.11	19.44	27.5	28.96	12.74	14.98	17.45
T8		Flower	33.38	40.22	54.17	30.56	30.84	33.98	20.01	21.95	23.00
T9	Hexaconazole (0.05%)		00	00	00	00	00	00	00	00	00
T10	Control (D.W.)		54.62	66.02	86.13	54.62	66.02	86.13	54.62	66.02	86.13

