

# Hexaconazole 5% against Leaf spot of *Vigna radiata* (Linn.) with Reference to Fungal spore concentration

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## ABSTRACT

*Vigna radiata* (Linn.) is a highly prized pulse. Cultivation and production of green gram showed decreased trend in last few years mainly due to the incidence of diseases. The aim of the study was to evaluate Hexaconazole in vivo against leaf spot disease causing fungi on Green gram. This experiment was conducted to examine the efficacy of Hexaconazole 5% Sc against Leaf spot (fungal disease) on Green gram caused by *Cercospora canescens*, *Fusarium equiseti* and *Curvularia lunata* in Green gram. Hexaconazole 5% Sc was used the concentration i.e. 400 ml/0.40 hectares and the same time airspora trapped by Tilak air sampler. The experiment was carried out during Kharif season-2017 and the experimental site exactly located on 19<sup>o</sup>.04945' latitude and 77<sup>o</sup>.684476' longitude. The results showed that Hexaconazole 5% Sc was highly effective in controlling the incidence of Leaf spot in Black gram. The spore concentrations of *Cercospora*, *Fusarium* and *Curvularia* were decreases after spraying the Hexaconazole 5% Sc fungicides as compare to untreated green gram field. Present investigation revealed that fungicide Hexaconazole 5% Sc is potent to control the leaf spot diseases on green gram caused by various fungi and enhance grain yield and quality of the seed.

**Keywords:** Airspora, Green gram, *Cercospora canescens*, *Fusarium equiseti*, Hexaconazole.

## INTRODUCTION

Green gram *Vigna radiata* (Linn.) is a highly prized pulse. It is widely cultivated in many tropical and subtropical regions of the world including India. The pulse is used in rheumatism, nervous and hepatic disease. The roots of the plants are narcotic and are used for aching bones. The plant prevents soil erosion and conserves soil moisture.

Cultivation and production of green gram showed decreases trend in last few years mainly due to the incidence of diseases. The average yield of green gram is very low due to low inherent yield potential and susceptibility of crop to the disease (Thakur et.al., 1977). Leaf spot disease caused by *Cercospora canescence* is a serious disease in the green gram growing areas during the season, which is responsible for 23% losses in yield (Quebral and Cagampang, 1970). Maximum loss of 61% was observed in case of grain yield (Iqbal et al., 1995). Several workers had reported the effective control of the disease with the application of fungicides (Singh and Naik, 1977, Singh and Singh, 1978).

## MATERIALS AND METHODS

The experiment was conducted in two different plots in the same location during 23<sup>rd</sup> June to 17<sup>th</sup> September 2017 (i.e. Kharif season) at 19<sup>o</sup>.04945' latitude and 77<sup>o</sup>.684476' longitude at Ganipur Tq. Umri Dist. Nanded (M.S.) to evaluate the efficacy of Hexaconazole 5% Sc against leaf spot disease in green gram and trap the airspora in same time in the field. The green gram variety (Nirmal seed) selected for the study and sowing was done on 29<sup>th</sup> June 2017 at a spacing 30 cm and 10 cm between rows and plants respectively.

The airspora trapped through continuous volumetric Tilak Air Sampler was installed in the Green gram field at a constant height of 1 M above the ground level in both the fields. Each fields nearly 0.50 hectares of land, completely devoted for the cultivation of Green gram was selected as a

sampling site. Air sampling was started from 23<sup>rd</sup> June 2017 to 17<sup>th</sup> September 2017. The scanning of slides and detailed calculation were obtained by using the method described by Singh (1988). The detailed metrological data of temperature, relative humidity and rainfall was collected from the Cotton Research Station, Nanded which is the nearest metrological observatory from the test field.

The first spray was taken up after initial appearance of the disease in the treated crop field and further sprays were done at an interval of 15 days with 'High Tech' sprayer @ 250 lit/0.50 hectore for through coverage of foliage with sprayer fluid. The severities of leaf spot were recorded one day before the every spray standard rating scales during the season in both the fields. Percent Incidence (PI) of the disease was calculated for Leaf spot. The yield was recorded from each net plot band computed to yield in 100 Kg/hectore.

## RESULTS

During the experimental period the data regarding the incidence of leaf spot was presented (Table 1). The results showed that the fungicides, Hexaconazole 5% Sc at the concentration 500ml/0.50 ha was found effective against leaf spot. The Percent Incidence (PI) of the leaf spot was nearly constant during the season in treated plot, since the incidence of leaf spot was very rare in the treatment compared with untreated control. Severe incidence of leaf spot was observed in untreated control plots during the season. Hence, it was evident that Hexaconazole 5% Sc was highly effective in controlling the incidence of leaf spot in green gram.

**Table 1:** Efficacy of Hexaconazole 5% Sc against leaf spot of green gram during Kharif season - 2017.

Treatment	PI (Percent Incidence) of leaf spot disease during 4 sprays				Yield Kg/0.50 ha
	I <sup>st</sup> spray (After 25day)	II <sup>nd</sup> spray (After 40 day)	III <sup>rd</sup> spray (After 55day)	Mean	
Hexaconazole 5% Sc 400ml/0.40ha	6.74	8.25	10.64	8.54	624
Untreated Plot	8.20	13.74	19.94	13.96	452

The results obtained in the present study revealed that all the treatments significantly increased the seed yield (624 Kg/0.50 ha) over the untreated control (452 Kg/0.40 ha). The grain yield was the highest from the experimental plots treated with Hexaconazole 5% Sc at 500ml/0.50 ha during the season. The fungicidal treatments not only increased the yield but grain quality was also superior as compared to uncontrolled plot.

The comparative study of leaf spot disease causing fungi showed that the treated field with fungicide Hexaconazole 5% Sc reported less number of diseases causing spores as compared to untreated fields (Table-2). Among the pathogenic fungi *Curvularia* total spore concentration was highest followed by *Cercospora* in treated fields. Further results showed that the number of spore is not constant throughout the season (ie. Variation in number). The *Cercospora* recorded monthly maximum concentration 5516/m<sup>3</sup> and 7252/m<sup>3</sup> of air was recorded in the month of August 2017 over treated and untreated green gram field respectively. The total concentration of *Cercospora* conidia 14448/m<sup>3</sup> and 19628/m<sup>3</sup> of air over treated and untreated plot of green gram fields respectively. During this investigation the *Cercospora canescens* causes leaf spot which was found on both the fields but their maximum disease incidence on untreated field of green gram field.

**Table 2:** Comparative concentration of leaf spot causing airborne fungal conidia over Black gram field.

Spore type	June (8 day)	July	August	Sept (17 day)	Total Spore Conc/m <sup>3</sup> of air
	Spore conc/m <sup>3</sup> of air				
<i>Cercospora</i> (Treated plot)	742	4676	5516	3514	14448
<i>Cercospora</i> (Untreated plot)	910	6216	7252	5250	19628
<i>Curvularia</i> (Treated plot)	1652	6762	7238	4212	19864
<i>Curvularia</i> (Untreated plot)	1848	8246	10248	7742	28084
<i>Fusarium</i> (Treated plot)	294	1512	1750	1120	4676
<i>Fusarium</i> (Untreated plot)	322	1862	2520	1624	6328

Among pathogenic fungi *Curvularia* causing the leaf spot (*C.lunata* (Wakker) Boed IMI No.3519080) was found to be the most dominant form and represented 19864 spores/m<sup>3</sup> and 28084/m<sup>3</sup> of air over treated and untreated field respectively, with an average incidence of 233.69 spores/m<sup>3</sup>/day and 330.4 spores/m<sup>3</sup>/day of air respectively treated and untreated fields. The occurrence of its spores in the air was recorded almost in all the days throughout the period of study. Its spore concentration in the air over the treated crop was a low as 98 spore/m<sup>3</sup>/day in the first week when the first *Curvularia* spores were trapped. However, there was an increasing frequency occurrence concurrently with the disease incidence day to day variation during the season.

The spore concentration of *Fusarium* was 294/m<sup>3</sup>&322/m<sup>3</sup>, 1512/m<sup>3</sup> & 1862/m<sup>3</sup>, 1750/m<sup>3</sup> & 2520/m<sup>3</sup> and 1120/m<sup>3</sup> & 1624/m<sup>3</sup> of air in the month of June, July, August and September over treated and untreated black gram field respectively. The total concentration of *Fusarium* spores 4676/m<sup>3</sup> and 6328/m<sup>3</sup> of air over treated and untreated field respectively.

## DISCUSSION

The test compound, Hexaconazole 5% Sc was proved effective against leaf spot diseases. the efficacy of hexaconazole against foliar fungal diseases in different crops was well documented. Dadke (1996) reported that hexaconazole(0.05%) was effective in controlling the rust in soybean among various fungicides. Similarly, Patil and Anahosur (1998) reported that hexaconazole at 0.1% sprayed at 15 days interval starting from the onset of disease was found effective in reducing severity of soybean rust with significant increase in seed yield. Nagaraja and Naik (1998) reported the efficacy of triazoles such as propiconazole, penconazole and difenconazole against powdery mildew of pea. Similarly, Khunti et al., (2002) observed that penconazole and hexaconazole effectively minimized the disease intensity of powdery mildew and increased the yield to considerable extent in green gram.

The spore concentration of *Cercospora* nearly constant during the season over treated field and it increasingly trend over untreated field. During this investigation the *Cercospora canescence* causes leaf spot on green gram crop. *Cercospora* leaf spot is a devastating disease that causes qualitative and quantitative losses to the crop (Sivprakasam, 1983). The *Cercospora* leaf spot disease well-defined spots often bound by veins and purplish border develop, the centres of which may turn grey, it appearing about 5-6 weeks after planting, depending upon the weather condition mostly temperature and humidity. It also caused premature defoliation and reduction in size of pods and grains (Grewal et al., 1980).

*Curvularia lunata* (Wakker) was isolated from the infected leaves and pods of green gram. The spotting is mostly confined to leaf blades; occasionally it occurs on the pods and floral parts. It might be due to the availability of infected test crop, dead and decaying materials and favourable weather condition. However, continuous rain affected the incidence of *Curvularia* spores in the air Mallaiah and Rao (1980). The presence of *Fusarium* spores in air over test field might be due to the prevalence leaf spot and top necrosis disease in untreated fields. *Fusarium equiseti* caused the leaf spot and top necrosis on green gram crops in untreated field. The incidences of disease occur after 4-5 weeks from the date of sowing.

## CONCLUSIONS

Present investigation revealed that fungicide Hexaconazole 5% Sc is potent to control the leaf spot diseases on green gram caused by various fungi and enhance grain yield and quality of the seed.

## REFERENCES

1. Bashir M, Zubair M. Survey report of Kharif pulses in Islamabad, Rawalpindi and Sialkot districts during (1985). Pulses program, Teach Report. Nat. Agric. Res. Center, Islamabad. 1985.
2. Dadke M. (1996) Studies on rust of soybean [*Glycine max* (L.) Merrill] caused by *Phakospora pachyrhizi* Syd. M.Sc.(Agri.) Thesis, UAS. Dharwad, India..
3. Grewal J, Machendra P, Kulshrestha D. (1980). Control of *Cercospora* leaf spot of green gram by spraying Bavistin. Indian Journal of Agril. Sci, 50, 70-71.
4. Iqbal S, Ghafoor A, Bashir M, Malik B. (1995). Estimation of losses in yield components of mung bean due to *Cercospora* leaf spot. *Pakistan J. Phytopath.* 7, 80-81.
5. Khunti J, Bhoraniya M, Vora V. (2002). Management of powdery mildew and *Cercospora* leaf spot mung bean by some systematic fungicides. *Journal of Mycology and Plant Pathology* 32(1), 103-105.
6. Mallaiah K, Rao A. (1980). Air spora of groundnut fields. *Proc. Ind. Acad. Sci. (Plant. Sci. Vol.89)*. 4, 269-281.
7. Nagaraja A, Naik K. (1998). Chemical control of powdery mildew and *Choanephora* rot of peas. *Pestology* 22, 5-7.
8. Patil P, Anahosur K. (1998). Control of soybean rust by fungicides. *Indian Phytopathology*. 51, 265-268. 1998.
9. Quebral F, Cagampang I. (1970). Influence of *Cercospora* leaf spot control on yield of mung bean. *Agriculture at los Banos*. 10, 7-12 .
10. Singh D, Singh R. (1978). Field evaluation of fungi seeds for the control of *Cercospora* leaf spot of green gram. *Pesticides*. 72, 28-29.
11. Singh S, Naik S. (1977). Field control of *Cercospora* leaf spot of Urd by Fungi seeds. *Indian J. Mycol. Pl. Pathol.* 6, 99.
12. Singh S. (1988). Studies on the air spora of Imphal. *Ph.D. Thesis*, Manipur University, Chanchipur, Imphal.
13. Sivprakasan K. (1983). Efficacy of some chemicals in the control of black gram (*Vigna mungo* (L.) Hepper) *Cercospora* leaf spot (*Erysiphe polygoni* DC.). *Madras Agriculture Journal* 70, 95-96.