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Survey and Studies on Alternaria Leaf Blight Disease of Groundnut(*Arachis hypogaea* L.) in Purvanchal Regions of Eastern (U. P.)

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ABSTRACT:-

***Alternaria spp. (Alternaria alternata*)** is one of the most destructive pathogen, causing leaf blight disease in Groundnut and there by inflicting accountable quantitative (49.30%) as well as qualitative losses. The survey studies indicated that, overall leaf blight incidence was comparatively higher in *Kharif* (2021-2022) grown Groundnut crop, compared to that of Kharif (2022-2023) grown crop. In all the eight districts of Purvanchal region surveyed, the disease was found to be widely distributed and regular occurrence with moderate to severe incidence and it's average incidence was found maximum in the district of **Maharajganj** (15.65%) followed by **Gorakhpur** (14.40%) and **Sant kabirnagar** (13.4%) districts in the years 2021-2022 and 2022-2023. The average incidence of leaf blight disease was found more in 2021-2022 (13.72%) as compared to 2022-2023 (12.88%). Of the various cultivars / varieties of Groundnut grown in the Purvanchal region, local cultivars (21.02% and 20.02%) without any proven resistance were found to suffer severely with the disease, during both the years. The most popularly grown PRAKASH was found to suffer more with about 19.08 and 16.08% (leaf blight) disease incidence during *Kharif* (2021-2022) and *Kharif*, (2022-2023), respectively. However, the cultivars *viz*., Amber ,Chandra, Kaushal and Chitra were found to suffer comparatively minimum with the leaf blight disease.

KEY WORDS:-

Groundnut,survey, *Alternaria alternata*, Alternaria leaf blight disease incidence.

INTRODUCTION:-

Groundnut (*Arachis hypogea* L.) is one of the most important leguminous oilseed crops.it is commonly known as peanut, earth nut and monkey nut..the peanut or monkey nut is a leguminous crop cultivated for edible purposes. It belonging to family ***Fabaceae*** and sub-family ***Papilionaceae***, which comprise important edible oilseed crops in the world. The most important useful part or the part of economical importance within the crop grows

under the ground as pods.It improves soil fertility by fixing atmospheric nitrogen and also used as a fodder for cattle. Groundnut is one most important oilseed crops in India, China, Nigeria, Sudan, Senegal, Niger, Tanzania, United States of America, Indonesia and Burma. Groundnut is as source of high quality edible oil (44-56%), easily digestible protein (22-30%), carbohydrates (10-25%), vitamins (E, K and B complex), minerals (Ca, P, Mg, Zn and Fe) and fiber. Groundnut shell can be used as fuel, animal feed, cattle litter, and filler in feed and fertilizer industry and in making particle boards and alcohol and acetone after fermentation. Haulm (above ground vegetative parts) used as animal fodder or in manuring, being groundnut roots add nitrogen (100-152 kg/ha) to the soil (Nigam, 2014). It is cultivated in 4.56 million ha and accounts for more than 11.07% of the total oilseed production (FAS/USDA 2017a). Although it is grown in all continents, over 75% of the total world. Groundnut production is concentrated in India, China, Nigeria and Sudan. It is the third important oil crop of the world after soybean and cotton. Groundnut is an important oilseed crop of India, grown extensively in various parts of the country in both kharif and summer seasons.

The leaf blight of peanuts caused by different species of *Alternaria* has been minor disease. The leaf blight disease of groundnut caused by *Alternaria alternata* was reported by Balasubramanian (1979),Subrahmanyam et al., (1981) , Vyas et al., (1985) and Narain et al., (1987) Patil and Hiremath (1996) reported *Alternaria tenuissima* and *Alternaria arachnidis*. Among the various diseases leaf blight infected by *Alternaria spp. (Alternaria alternata*) affecting groundnut has been reported as one of the important diseases causing potential yield losses in groundnut crop (Kumar et al., 2012 and Kantawa et al., 2014)

Leaf blight disease caused by *Alternaria alternata* is major constraint and has potential to reduce groundnut production in eastern Uttar Pradesh region. The objective of this study was to management of *Alternaria* leaf blight of groundnut caused by *Alternaria alterna* through bio-agent and fungicides to increased farmers income.

Some studies on peanut crop have been reported for *Alternaria* in the U.S. The outbreak of *Alternaria alternata* causes leaf blight disease in peanut has been reported in Gujarat, India in 2012 . *Alternaria alternata* is known as a plant pathogenic saprophyte and regarded as a weak filamentous fungus. The pathogenic species produced harmful mycotoxin, which can contaminate plant products and are subject to cancer.

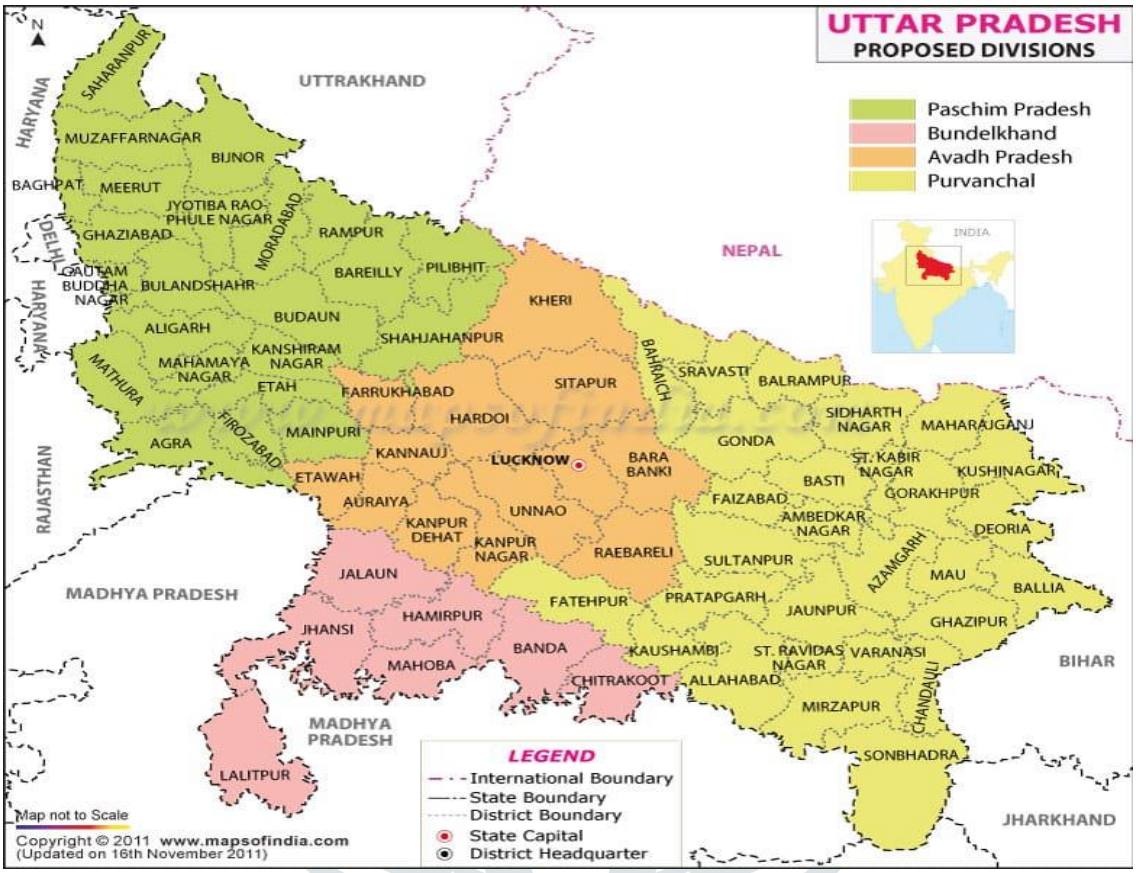
The leaf spot disease is triggered by three species of the *Alternaria* (soil-borne fungi). The primary source of inoculum is believed to be infected seeds. Severe yield losses can occur while the environmental conditions are conducive for the pathogen. *A. arachidis* cause leaf spot, which is small brown, irregular shaped spots surrounded by a yellowish halo on leaves. The Dark brown lesion proceeds to midrib and the entire leaves appears to be blighted, curls inward and becomes brittle (**leaf blight**). The lesions developed by *Alternaria alternata* are small, round to irregular in shape and spread over the whole leaf. Symptoms appeard as chlorotic and water soaked but in a few days, they enlarge, they turn necrotic and also affect the adjacent veins known as leaf spot and venial necrosis.

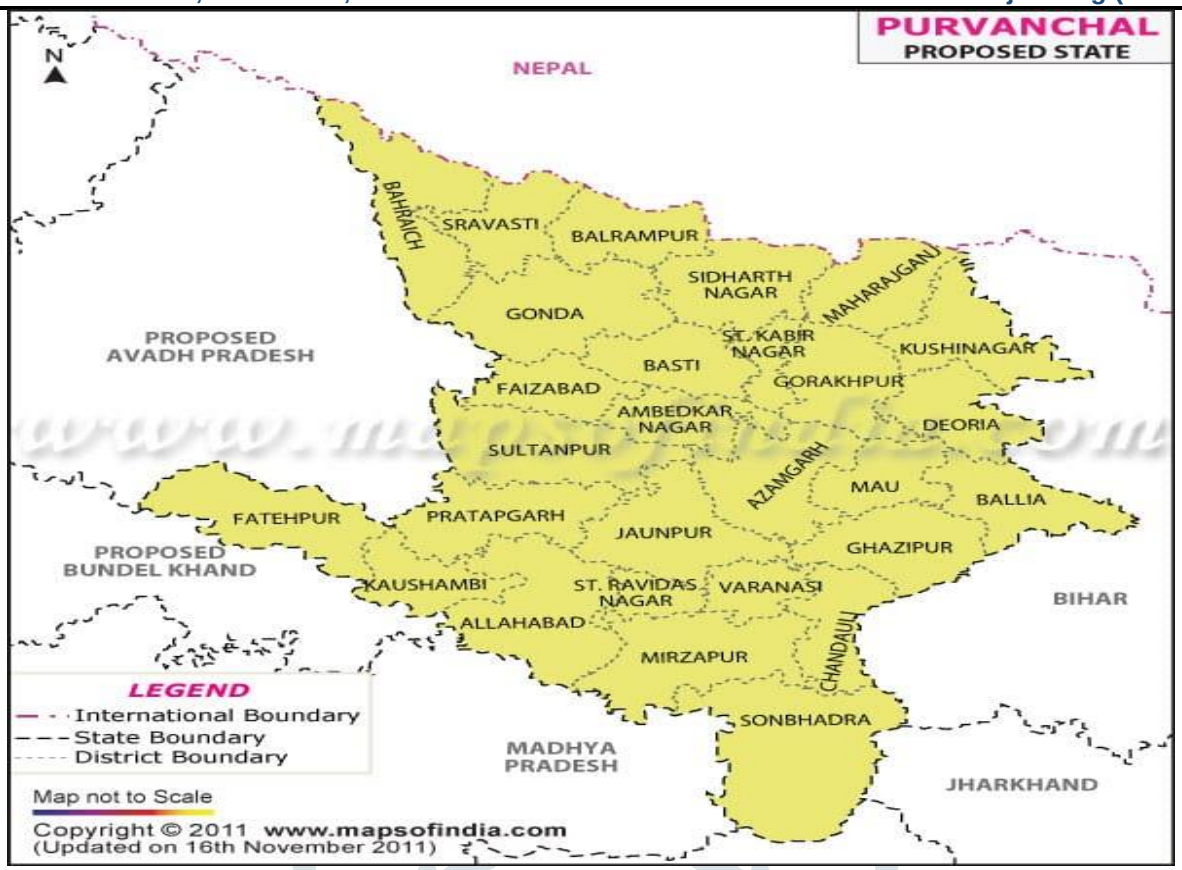
RESEARCH PROCEDURE:-

A roving survey was conducted during the *Kharif* 2021-2022and *Kharif* 2022-2023 seasons in the Groundnut growing areas of the eight districts of Purvanchal region to asses leaf blight disease incidence. Groundnut growing pockets / fields were identified from the records available at the office of Sub-Divisional Agriculture Officer of the districts to be surveyed.

The field visits were undertaken during flowering and pod formation stages of the crop. The incidence of disease was recorded by random throwing of quadrant (l m2) in five place of a field. The numbers of healthy and diseased plants were counted in a quadrant and per cent of disease incidence was estimated by following formula.

$$Disease\ incidence\ (\%) = \frac{Number\ of\ diseased\ plants\ in\ quadrant}{Total\ number\ of\ plants\ in\ the\ quadrant} x\ 1$$





RESEARCH ANALYSIS AND REASONING:-

The survey of 121 farmers fields of Groundnut crop from eight districts (Kushinagar,Deoria,Gorakhpur,Maharajganj,Basti,Sant Kabir Nagar,Shravasti and Azamgarh) of Purvanchal region of the Uttar Pradesh state was carried out during *Kharif* (2021-2022) and *Kharif* (2022-2023) seasons to record seasonal incidence of leaf blight disease.


Fig. Alternaria leaf spot

District-wise seasonal disease incidence : -

Results (Table 1) revealed that in the eight districts surveyed during *Kharif* (2021-2022), the average incidence of leaf blight ranged from 11.15 (Shravasti) to 15.82 (Maharajganj) per cent. However, the Groundnut crop grown in the district of Maharajganj was found to suffer more with leaf blight incidence of 15.82 per cent; with overall average incidence of Leaf blight (13.72%). The second highest average Leaf blight incidence of 14.76 per cent was recorded from the Gorakhpur district. This was followed by the districts of Sant Kabir Nagar (14.55%), Azamgarh (14.30%), Deoria (13.27%), Basti (13.06%) and Kushinagar (12.71%) with average Leaf blight incidence. Comparatively minimum average Leaf blight incidence of 11.15 per cent was recorded in the district of Shravasti.

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Table 1 :	Average incidence of **Leaf blight** (%) disease of Groundnut in Purvanchal region of Eastern Uttar Pradesh during *Kharif* **2021-2022**		
Sr. No.	District	No. of location	Leaf blight incidence
1	Kushinagar	12	12.71
2	Deoria	13	13.27
3	Gorakhpur	16	14.76
4	Maharajganj	14	15.82
5	Basti	15	13.06
6	Sant Kabir Nagari	12	14.55
7	Shravasti	13	11.15
8	Azamgarh	10	14.30
Avarage Leaf blight incidence (%)			**13.72**

During *Kharif*, 2022-2023, Leaf blight incidence (Table 2) was found to be comparatively minimum to that of during *Kharif*, 2021-2022. The average incidence of Leaf blight ranged from 11.17 (**Kushinagar**) to 15.48 (**Maharajganj**) per cent. However, the Groundnut crop grown in the district of Maharajganj was found to suffer more with Leaf blight incidence 15.48 per cent and; with overall average incidence of Leaf blight (12.88%). The second highest average Leaf blight incidence of 14.05% per cent was recorded from the **Gorakhpur** district. This was followed by the districts of **Deoria** (13.10%), **Shravasti** (12.38%), **Basti** (12.27%), **Sant Kabir Nagar** (12.25%) and **Azamgarh** (11.57%) with average Leaf blight incidence. Comparatively minimum average Leaf blight incidence of 11.17 per cent was recorded in the district of **Kushinagar.**

Table 2:	Average incidence of Leaf blight (%) disease of Groundnut in Purvanchal region of Eastern Uttar Pradesh during Kharif 2022-2023		
Sr.No.	Distric	No. of locations	Leaf blight incidence(%)
1	Kushinagar	12	11.17
2	Deoria	13	13.10
3	Gorakhpur	16	14.05
4	Maharajganj	14	15.48
5	Basti	15	12.27
6	Sant Kabir Nagari	12	12.25
7	Shravasti	13	12.38
8	Azamgarh	10	11.57
Average Tikkaincidence (%)			**12.88**

Variety-wise seasonal disease incidence : In the eight districts of the Purvanchal region surveyed for recording Leaf blight disease incidence, a wide range of Groundnut cultivars / varieties and local varieties were grown by the farmers. The results obtained on Leaf blight disease incidence are presented in the Tables 3 and 4.

During *Kharif* 2021-2022, average incidence (Table 3) of Leaf blight on Groundnut cultivars / varieties ranged from 12.17 (**Chitra**) to 21.02 (**Local**) per cent. However, Local cultivar of Groundnut was found to suffer more with Leaf blight incidence of 21.02 per cent; with overall highest average incidence of Leaf blight (16.17%). The second highest average Leaf blight incidence (19.08%) recorded on **Prakash**. This was followed by the cultivars *viz*., **Amber** (15.55%), **CHANDRA**

Table 3:	Variety –wise incidence of Leaf blight (%) disease of Groundnut in Purvanchal region of Eastern Uttar Pradesh during Kharif 2021-2022	
Varieties	**No. of locations**	**Average Leaf blight incidence (%)**
Local	**25**	**21.02**
Chitra	**36**	**12.17**
Prakash	**21**	**19.08**
Amber	**09**	**15.55**
Chandra	**06**	**14.23**
Kaushal	**08**	**13.61**

(14.23%) and Kaushal (13.61%) with Leaf blight average incidence. Comparatively minimum average Leaf blight incidence of 12.17 per cent was recorded on the Groundnut cv. **Chitra**.

During *Kharif* 2022-2023, average incidence (Table 4) of Leaf blight on Groundnut cultivars / varieties ranged from 12.08 (**Chitra**) to 20.02 (**Local**) per cent. However, Local cultivar of Groundnut was found to suffer more with Leaf blight incidence of 20.02 per cent; with overall highest average incidence of Leaf blight (15.03%). The second highest average Leaf blight incidence of 16.08 per cent was recorded on cv. **Prakash**. This was followed by the cultivars *viz*., Amber (14.28%), Chandra (13.39%) and Kaushal (12.15%) with Tikka average incidence. Comparatively minimum average Leaf blight incidence of 12.08 per cent was recorded on the Groundnut cv. **Chitra**.

Table 4:	Variety –wise incidence of Leaf blight (%) disease of Groundnut in Purvanchal region of Eastern Uttar Pradesh during Kharif 2022-2023	
Varieties	**No. of locations**	**Average Leaf blight incidence (%)**
Local	**25**	**20.02**
Chitra	**36**	**12.08**
Prakash	**21**	**16.08**
Amber	**09**	**14.28**
Chandra	**06**	**13.39**
Kaushal	**08**	**12.15**

Thus, perusal of the data obtained during present survey study revealed that in the region of Purvanchal, the Groundnut crop grown during *Kharif* (2021-2022) season was severely affected with the Leaf blight disease (*Alternaria spp. (Alternaria alternata*) than that of the crop grown during *Kharif* (2022-2023) season. Results (Table 5) revealed that in the eight districts surveyed during *Kharif* (2021-2022) and *Kharif* (2022-2023), the average incidence of leaf blight ranged from 11.73 (**Shravasti**) to 15.65 (**Maharajganj**) per cent. However, the Groundnut crop grown in the district of Shravasti was found to suffer more with Leaf blight incidence of 15.65 per cent; with overall average incidence of Leaf blight (13.30%).

The second highest average Leaf blight incidence of 14.40 per cent was recorded from the Gorakhpur district. This was followed by the districts of **Deoria** (13.18%), **Sant Kabir Nagar** (13.4%), **Azamgarh** (12.93%),**Basti** (12.66%), and **Kushinagar** (11.94%) with average Leaf blight incidence. Comparatively minimum average Leaf blight incidence of 11.73 per cent was recorded in the district of **Shravasti.**

Table 5:	**Average incidence of the leaf blight (%) disease of Groundnut in Purvanchal region during Kharif 2021-2022 and Kharif 2022-2023**				
Sr. No.	Districts	No. of location	*leaf blight incidence* (%)		Average leaf blight incidence (%)
			Kharif 2021 – 2022	*Kharif* 2022 – 2023	
1	Kushinagar	12	12.71	11.17	11.94
2	Deoria	13	13.27	13.10	13.18
3	Gorakhpur	16	14.76	14.05	14.40
4	Maharajganj	14	15.82	15.48	15.65
5	Basti	15	13.06	12.27	12.66
6	Sant Kabir Nagari	12	14.55	12.25	13.4
7	Shravasti	13	11.15	12.38	11.73
8	Azamgarh	10	14.30	11.57	12.93
Average incidence (%)			13.72	12.88	13.30

Table 6	Variety –wise average incidence of **leaf blight** (%) disease of Groundnut in Purvanchal region during Kharif **2021-2022** and Kharif **2022-2023**			
Sr. No.	Varieties	*leaf blight incidence* (%)		Average leaf blight incidence (%)
		Kharif 2021 – 2022	*Kharif* 2022 – 2023	
1	Local	21.02	20.02	20.52
2	Chitra	12.17	12.08	12.12
3	Prakash	19.08	16.08	17.58

4	Amber	15.55	14.28	14.91
5	Chandra	14.23	13.39	13.81
6	Kaushal	13.61	12.15	12.88
Average incidence (%)		16.17	15.03	15.60

Further, of the Groundnut cultivars grown by the farmers in this region, average maximum leaf blight incidence during *Kharif* (2021-2022) and *Kharif* (2022-2023) on Groundnut Local cultivars (20.76%) followed by the Prakash(18.49%), CHANDRA (15.00%), Chitra (14.77%), Amber (14.20%) and Kaushal (12.05%) were recorded to suffer more by Leaf spot *Alternaria spp. (Alternaria alternata*) disease (Table 6).

The variation in the leaf blight incidence within a village of different districts of Purvanchal region might be due to variation in soil type as the association and spread of leaf blight pathogen is more in heavy type of soils compared to lighter one. The magnitude of leaf blight incidence was higher under rainfed conditions this might be due to favourable conditions of low moisture with high temperature prevailed in crop growth period, as leaf blight pathogen favours dry conditions. The black cotton soil is characterized with higher vegetation which leads to deposition of high organic amendments thereby increasing the carbon levels significantly. Rich carbon source available in black cotton soil also allows significantly high multiplication inoculums of *Alternaria* there by giving higher incidence.

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