



ISSN (E): 2277- 7695  
ISSN (P): 2349-8242  
NAAS Rating: 5.23  
TPI 2021; SP-10(6): 425-429  
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Received: 07-04-2021  
Accepted: 09-05-2021

**L Rajasekhar**  
Department of Entomology,  
Agricultural College, Bapatla,  
Andhra Pradesh, India

**T Madhumathi**  
Professor, Department of  
Entomology, Agricultural  
College, Bapatla, Andhra  
Pradesh, India

**DV Sairamkumar**  
Professor, Department of  
Entomology, Agricultural  
College, Bapatla, Andhra  
Pradesh, India

**V Prasanna Kumari**  
Associate Professor Department  
of Plant pathology, Agricultural  
College, Bapatla, Andhra  
Pradesh, India

**V Roja**  
Assistant Professor, Department  
of Genetics and Plant breeding,  
Agricultural College, Bapatla,  
Andhra Pradesh, India

**Corresponding Author:**  
**L Rajasekhar**  
Department of Entomology,  
Agricultural College, Bapatla,  
Andhra Pradesh, India

## Bud necrosis disease of blackgram: its prevalence in krishna zone of Andhra Pradesh

**L Rajasekhar, T Madhumathi, DV Sairamkumar, V Prasanna Kumari and V Roja**

### Abstract

**Aim:** To study the prevalence of Bud Necrosis Disease on blackgram in major blackgram growing regions of Andhra Pradesh

**Study design:** Random Survey.

**Place and Duration of Study:** Rabi 2019-2020, Department of Entomology Agricultural College, Bapatla

**Methodology:** A random survey was conducted in three districts of Krishna zone in Andhra Pradesh during rabi 2019-2020 to estimate the incidence of bud necrosis disease in blackgram crop. Five major blackgram growing mandals were selected from Krishna, Guntur and Prakasam districts and three villages from each mandal were selected randomly to carry out the survey regarding percent disease incidence.

**Results:** Highest per cent mean incidence of bud necrosis disease in blackgram was found *i.e.* 15.99% in Guntur district. Prakasam district had mean disease incidence of 12.14%. Lowest disease incidence was found in Krishna district with 6.1%. Overall highest mean bud necrosis disease incidence was recorded from Tadikonda mandal of Guntur district with 20.12% followed by Chinaganjam mandal of Prakasam district with 19.81%. Mean per cent disease incidence in all the villages of three districts of Krishna zone ranged in between 1.60% (Vakkalagadda of Challapalli mandal of Krishna district) to 26.56% (Chinthalapudi village of Ponnuru mandal in Guntur district).

**Conclusion:** Bud Necrosis Disease or leaf curl disease in blackgram crop is becoming key viral disease next to MYMV in major blackgram growing areas in Krishna Zone of Andhra Pradesh. Periodical systematic surveys are necessary to establish disease prediction models and to design suitable management tactics to mitigate the losses caused by Bud Necrosis disease in blackgram crop.

**Keywords:** bud necrosis, disease incidence, GBNV, thrips

### 1. Introduction

Blackgram is commonly known as urdbean and scientifically *Vigna mungo* (Linn.) Hepper. It belongs to the family Leguminosae and is an important pulse crop grown in India. Like other legume plants it enriches soil through nitrogen fixation. Blackgram predominantly cultivated as *rabi* crop all over India and also as *kharif* crop in uplands of some major states *viz.* Uttar Pradesh, Madhya Pradesh, Andhra Pradesh, Karnataka and Maharashtra. It is a short duration crop of 80-95 days. Blackgram is mainly cultivated for its protein rich seed which occupies good share in Indian diet in various forms. 100g urd bean seed contains 24g protein, 1.6 g fat, 63.4g carbohydrate and 16.2 per cent total dietary fiber. Blackgram is also a good source of vitamins. Every 100g seed contains 0.6mg of thiamin, 0.2 mg riboflavin, 2.3mg niacin, 0.2mg vitamin B<sub>6</sub> (Indian Institute of Pulse Research). It is an important grain legume crop with high and easily digestible protein, and low flatulence contents (Salam *et al.*, 2009) [13]. In India during *kharif* 2019-20, area covered under black gram is 36.44 lakh ha with a production of 17.23 lakh tonnes. The major blackgram growing states are Madhya Pradesh (17.52 lakh ha), Uttar Pradesh (5.19 lakh ha), Rajasthan (5.02 lakh ha), Maharashtra (3.08 lakh ha), Karnataka (0.65 lakh ha) and Andhra Pradesh (0.15 lakh ha) during *kharif*. (Kharif pulse prospectus-DPD Bhopal) [7]. In Andhra Pradesh, blackgram occupies an area of 0.31 million hectares, giving a total production of 0.32 million tons with a productivity of 977 kg/ha (Department of Agriculture and Cooperation, GOI, 2018-19) [2]. In coastal Andhra Pradesh, it fits well under rice fallow-pulse ecosystem with residual moisture after the harvest of paddy. Rice fallow blackgram is mainly attacked by certain disease like powdery mildew and leaf spots leading to great loss to the farmers. Whitefly transmitted yellow mosaic disease and thrips transmitted *Tospo virus* causing bud necrosis disease also contributing for further yield loss in blackgram.

Recent past statistics about yield losses of blackgram revealed that those viral diseases are causing more losses in blackgram rather than fungal diseases. However, viral diseases are considered to be the most serious constraint in urdbean production across the Indian sub-continent with an annual estimated yield loss up to 5-100% depending upon genotype and the age of the plant at which the infection occurs (Nene 1972) [9]. Thrips transmitting bud necrosis disease is mainly infesting crop in early stages of the crop and reaching its peak towards maturity of the crop causing considerable yield loss. Limited numbers of reports were available about the bud necrosis disease incidence in blackgram crop in the coastal districts of Andhra Pradesh where blackgram crop being predominantly cultivated under rice fallow cropping system. Hence present investigation was focused on to know the disease incidence level in different major blackgram cultivating regions of Krishna zone of Andhra Pradesh.

## 2. Material and Methods

Blackgram is mainly cultivated as rice fallow crop and also as *rabi* crop in coastal districts of Andhra Pradesh. A random survey was conducted during *rabi* 2019-2020 in three districts of Krishna zone in the state of Andhra Pradesh. During this survey three predominant blackgram growing districts *i.e.* Krishna Guntur, Prakasam were selected to estimate the incidence of bud necrosis disease in blackgram. In each district five major black gram growing mandals and in each mandal three villages were selected based on previous blackgram crop cultivation particulars. In each village three fields were selected random. In each field disease incidence of bud necrosis was estimated. Five micro plots each of one square meter were fixed in the field one each in four quarters of the field and one in the middle leaving border rows at vegetative to pre harvest stage of the crop. Observations *viz.* variety, stage of the crop, type of soil, preceding crop, total number of plants and total number of diseased plants in a square quadrat was recorded properly. Disease incidence was calculated using the following formula.

$$\text{Percent Disease Incidence} = \frac{\text{Number of diseased plants}}{\text{Total Number of plants}} \times 100$$

Mean percent disease incidence was calculated village, mandal, district wise and was depicted in table no.1.

## 3. Results and Discussion

After careful examination of the results it is evident that the highest mean percent bud necrosis disease incidence was observed in the Guntur district *i.e.* 15.99%. Prakasam district was found next to the Guntur district with 12.14%. Least per cent disease incidence (6.10%) was observed in Krishna district (Table No. 1 and Fig No.4). Highest disease incidence *i.e.* 20.12% was recorded from Tadikonda mandal of Guntur district whereas least disease incidence was recorded (2.99%) from Pamarru mandal of Krishna district (Table No.1). In Guntur district mean per cent disease incidence ranged in between 13.34 to 20.12%. In Guntur district minimum disease incidence was recorded (4.55%) in Chebrolu village of Chebrolu mandal whereas the highest disease incidence (26.56%) was recorded from Chinthalapudi village of Ponnuru mandal (Fig No.2). The mean per cent disease incidence of Prakasam district was in the range of 5.39% to 19.81%. Gonasapudi village in chinaganjam mandal of

Prakasam district was found with the highest mean per cent disease incidence of 25.71% whereas least disease incidence was 2.12% from Nidamanuru of Naguluppapadu mandal (Fig No.3). In comparison with Prakasam and Guntur districts Krishna district recorded with lower disease incidence levels ranged in between 2.99% to 7.50% (Table No.1 and Fig No.1). Lowest mean percent disease incidence in Krishna district was from Vakkalagadda village of Challapalli mandal *i.e.* 1.60%. Modumudi village of Avanigadda mandal recorded with highest disease incidence among all the surveyed areas in Krishna district *i.e.* 9.72% (Fig No.1). Wide variation was observed in mean percent disease incidence among all the surveyed areas in Krishna zone, this variation was in the range of 1.60 to 26.56% (Table No.1). Majority of the surveyed areas were occupied with the variety LBG 752, next to that was PU 31. Disease incidence was observed on all the varieties grown in the Krishna zone including hybrids and local varieties. None of the varieties were found without bud necrosis disease incidence among the surveyed locations.

Surveys for recording the incidence of bud necrosis disease in pulses were started in India much earlier. Several authors reported bud necrosis disease incidence from different corners of the country by conducting surveys during their study. Earliest report of bud necrosis in blackgram was reported by Nene (1968) [10] from Panthnagar and he has mentioned it as leaf curl disease of blackgram and green gram. Later it was confirmed by Ghanekar and Beniwal (1975) [3]. Nene (1972) [9] conducted a survey in 33 districts of Uttar Pradesh and reported that leaf curl disease was restricted to Nainital and Aligarh districts only. Survey conducted by Amin (1985) [1] reported that bud necrosis disease incidence ranged from 0 to 1 per cent in Chittoor, Guntur, Nellore districts. In Kurnool district it was 0 to 10%, 5-15% in Prakasam, 33% in Karimnagar, 5 to 60% Nizamabad district. Based on his study Sreenivasulu (1994) [14] reported that leaf curl disease incidence in blackgram crop in Guntur district was in the range of 2.12 to 13.12%. Krishnaveni (1998) [8] conducted an extensive survey in blackgram fields during 1991-1992 *kharif and rabi* seasons and reported that PBNV (referred as TSWV) incidence was in between 39 to 43.6% in Chittoor district, whereas in Guntur it was 4.90 to 35.90%; in Rangareddy district it was in between 2.5 to 30.9%. Gopal (1998) [4] reported that PBNV incidence was observed on several crops and also mentioned that disease incidence was ranging from 16.6 to 37.6% in blackgram crop in Andhra Pradesh. Jyothirmayi Madhavi (2009) [5] reported that bud necrosis disease incidence was very negligible during *rabi* 2007-2008 in Guntur district where as in *kharif* it was in the range of 1.68 to 3.63%. In Krishna district bud necrosis disease incidence was very low during *rabi* season and during *kharif* it was 0 to 1.3%. Ratnam *et al.* (2015) [12] reported that blackgram leaf curl disease was in the range of 6 to 18% in Guntur district, lowest disease incidence 6% was recorded from Nidubrolu village of ponnuru mandal. Mean incidence for a mandal was recorded highest in Tsundur mandal 12.08% followed by Chebrolu and Ponnuru mandal with 10.92 and 8.92% respectively. Prasad *et al.* (2018) [11] in his report mentioned about occurrence of blackgram leaf curl disease in Krishna, Guntur and Prakasam districts of Andhra Pradesh during *rabi* 2018. He has reported that mean per cent disease incidence of leaf curl in blackgram was 6.23%, 6.26%, 4.10% in Krishna, Guntur, Prakasam districts respectively. Rao *et al.* (2021) [6] conducted a survey in Guntur district of Andhra Pradesh and reported that overall mean incidence of urd bean leaf curl

disease was 16.06% during *khariif* season whereas it was 11.65% during *rabi*. He has also reported that Govada village of Amarthalur mandal in Guntur district recorded highest

mean per cent disease incidence *i.e.* 30.99% during *khariif* 2019-2020 and Amarthalur village of Amarthalur mandal with 15.33% during *rabi*.

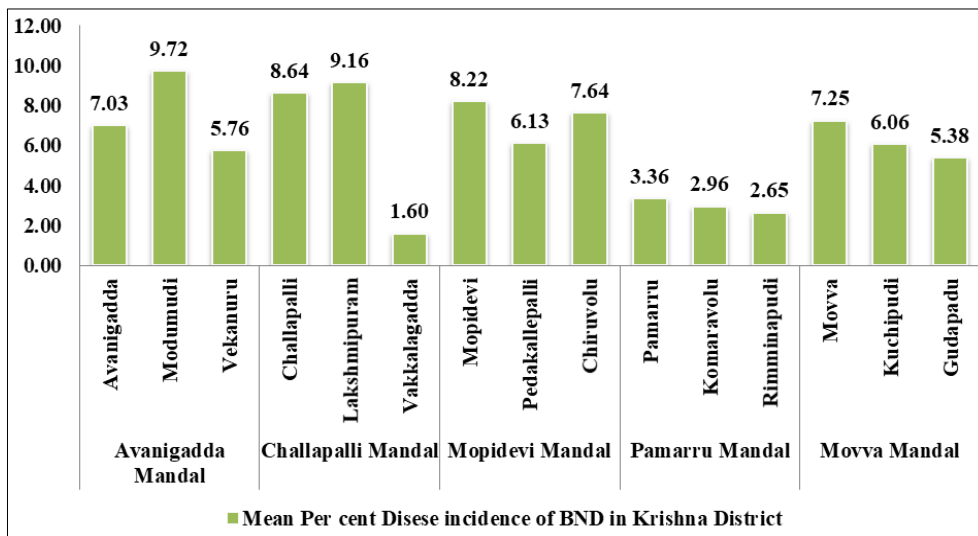


Fig 1: Bud Necrosis Disease incidence in Krishna district during *rabi* 2019-2020

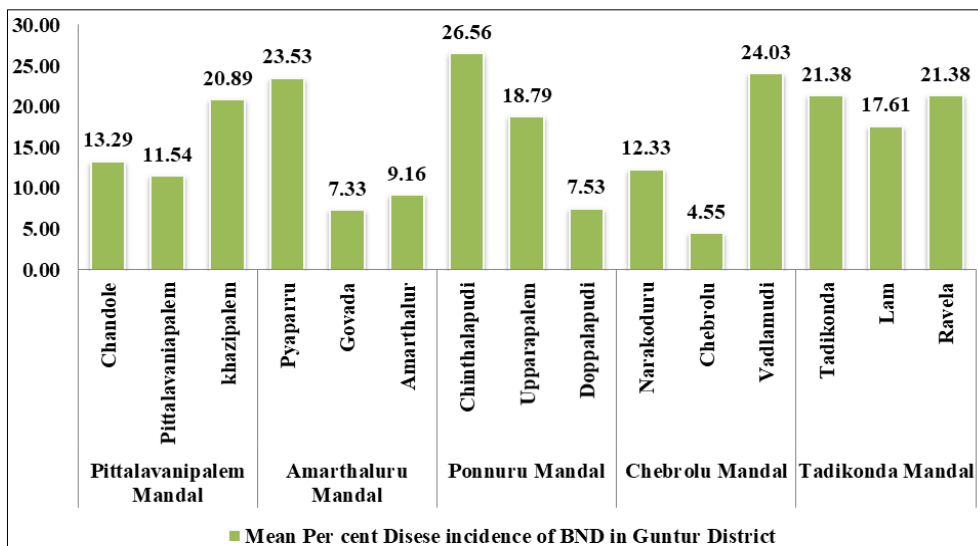


Fig 2: Bud Necrosis Disease incidence in Guntur district during *rabi* 2019-2020

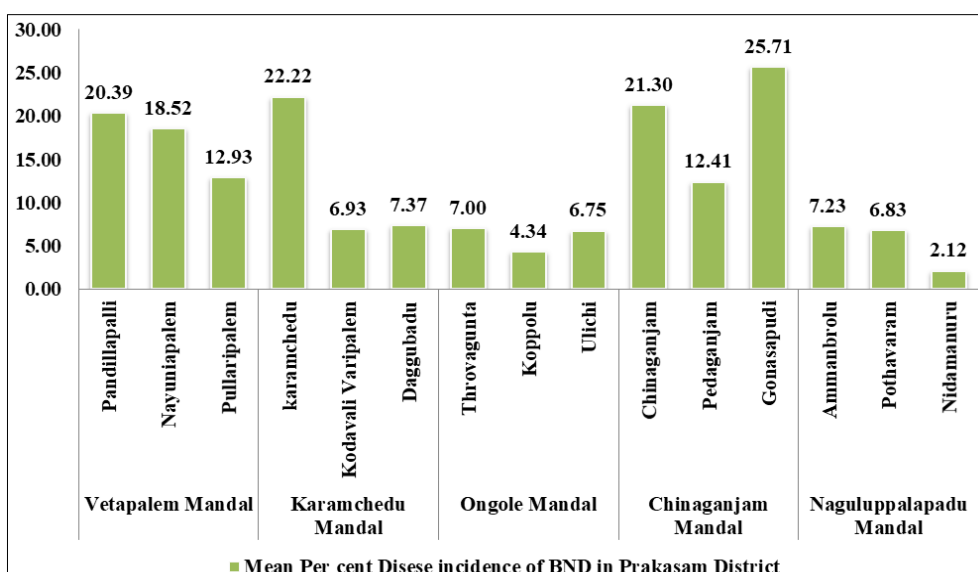
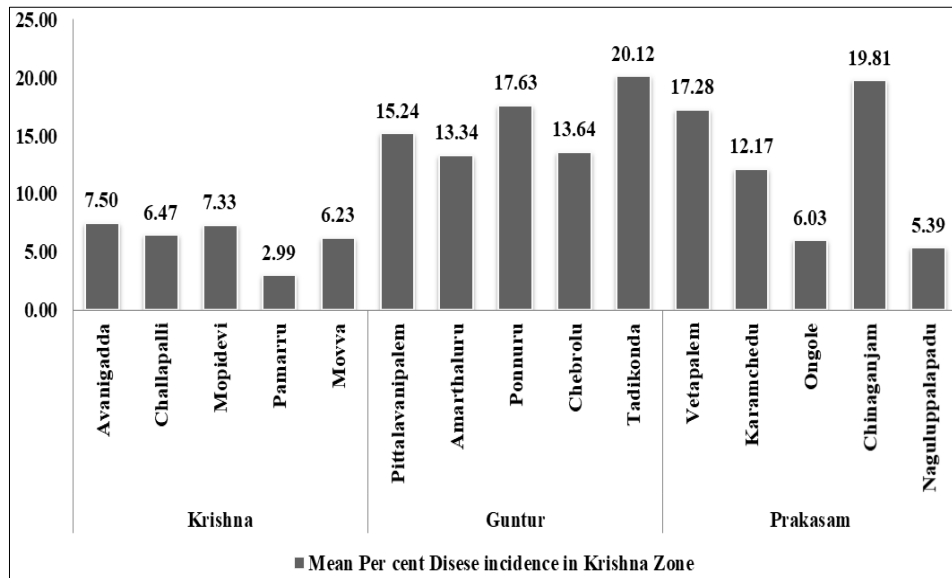


Fig 3: Bud Necrosis Disease incidence in Prakasam district during *rabi* 2019-2020



**Fig 4:** Bud Necrosis Disease incidence in Krishna Zone during *rabi* 2019-2020

#### 4. Conclusion

An over view of bud necrosis disease incidence and spread in blackgram growing regions of Andhra Pradesh revealed interesting facts. Our present study and reports by various workers in the last two decades showing that bud necrosis or leaf curl disease in blackgram crop is becoming key viral disease next to MYMV and its occurrence is static with varying degrees. In an early report by Amin 1985 it was one per cent in the district Guntur, later years after a decade approximately it was recorded as high as 35.9 per cent indicating its profound spread. Interestingly a negligible disease incidence was reported in 2009. But in recent past studies after 2015, drawing our attention towards this disease as quite promising incidence levels were recorded with a minimum of 6 per cent to 26 per cent in the survey during *rabi* 2019-2020 (Present Study). Similar kind of trend was also observed in other districts like Krishna and Chittoor. However in the district Prakasam frequency and occurrence of this disease is quite static since early report by Amin 1985 to present study. This thrips transmitting Bud Necrosis Disease found to occur in blackgram in the early stage of the crop. Initial disease occurrence was observed in 20 days old blackgram crop during this survey. Per cent disease incidence was found to increase from vegetative stage to till maturity due to poor management of vector population by the farmers throughout the season. None of the blackgram variety including local and hybrids was found without any disease incidence during this survey. This study lead us to adopt better management tactics from the beginning of the season especially *rabi* as the temperature and other climatic factors are highly favorable for multiplication of thrips and in turn development of bud necrosis disease indirectly. Seed treatment, eradication of alternate weed hosts, cultivation of resistant varieties are to be followed to control the vector in the initial stages of the crop to prevent yield loss.

#### 5. Acknowledgements

This study would not have been possible without the help of my supervisor as well as mentor who has advised me at every step of my research. It is my immense pleasure and great honor that being a student of her. I am very much thankful to my beloved parents, wife and my daughter as well as friends who have given a moral support in writing this paper.

#### 6. References

- Amin PW, Ghanekar AM, Rajeshwari R, Reddy DVR. Tomato spotted wilt virus as the causal pathogen of leaf curl of mungbean *Vigna radiata* (L.) Wilczek and urdbean *Vigna mungo* (L.) Hepper in AP, India. Indian Journal of Plant Protection 1985;13:9-13.
- Department of Agriculture and Cooperation, Government of India. Area and production of agricultural crops in India 2018-19; [www.indiaagristat.com](http://www.indiaagristat.com).
- Ghanekar AM, Beniwal SPS. Cow pea a local lesion host for mungbean leaf curl virus. Indian phyto pathology 1975;28:527-258.
- Gopal K. Epidemiology and Management of Peanut bud necrosis disease and transmission of Peanut yellow stripe virus by *Scirtothrips dorsalis* (Hood) in Groundnut (*Arachis hypogea* L.) Ph.D. Thesis, University of Agricultural Sciences, Bangalore, Karnataka, India 1998.
- Jyothirmai Madhavi K, Identification and characterization of Peanut bud necrosis virus (PBNV) and Tobacco streak virus (TSV) in blackgram (*Vigna mungo* L. Hepper) and Greengram (*Vigna radiata* L. Wilczek). Ph.D. Thesis. Acharya N.G. Ranga Agricultural University. Hyderabad, Andhra Pradesh, India 2009.
- Kasi Rao M, Adinarayan M, Patibanda AK, Madhumathi T. Prevalence of Viral diseases of Urdbean in Guntur District of Andhra Pradesh. Biological Forum: An International Journal 2021;13(1):261-269.
- Kharif pulses prospects. DPD, Bhopal 2020-21.
- Krishnaveni D. Studies of transmission of blackgram leaf crinkle virus. M. Sc. (Ag.) Thesis submitted to Andhra Pradesh Agricultural University 1988.
- Nene YL. Annual Report (No.1) Project, FG In-358. Uttar Pradesh Agricultural University, Pantnagar, India 1968.
- Nene YL. A survey of the viral diseases of pulse crops in Uttar Pradesh. First Annual Report. F.G-In-358, Uttar Pradesh Agricultural University 1972, 1-25.
- Prasad K. Characterization of viruses associated with leaf curl and stem necrosis diseases of blackgram in Andhra Pradesh. M.Sc. (Ag.) Thesis. Acharya N.G. Ranga Agricultural University. Guntur, Andhra Pradesh, India 2019.

12. Ratnam NJ. Studies on viral diseases of urdbean [*Vigna mungo* (L.) Hepper]. M. Sc.(Ag.) Thesis. Acharya N.G. Ranga Agricultural University, Hyderabad, India 2015.
13. Salam SK, Patil MS, Byadgi AS. IDM of mungbean yellow mosaic disease. Annals of Plant Protection Science 2009;17:157-160.
14. Sreenivasulu A. Effect of certain management practices on the occurrence of thrips and leaf curl virus on blackgram (*Vigna mungo* L. Hepper). M.Sc. (Ag.) Thesis. Acharya N G Ranga Agricultural University, Rajendranagar, Hyderabad, Andhra Pradesh, India 1994.