



ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2021; 10(12): 1198-200
© 2021 TPI

www.thepharmajournal.com

Received: 09-09-2021

Accepted: 20-11-2021

K Sushma

PG Scholar, Department of Plant Pathology, College of Horticulture, Dr. Y.S.R. Horticultural University, Anantharajupeta, Y.S.R. Kadapa, Andhra Pradesh, India

T Nagalakshmi

Senior Scientist, Department of Plant Pathology, Horticultural Research Station, Venkataramannagudem, West Godavari, Andhra Pradesh, India

K Arunodhayam

Assistant Professor, Department of Plant Pathology, College of Horticulture, Dr. Y.S.R. Horticultural University, Anantharajupeta, Y.S.R. Kadapa, Andhra Pradesh, India

Syed Sadarunnisa

Professor, Department of Horticulture, College of Horticulture, Dr. Y.S.R. Horticultural University, Anantharajupeta, Y.S.R. Kadapa, Andhra Pradesh, India

M Ramaiah

Professor, Department of Entomology, College of Horticulture, Dr. Y.S.R. Horticultural University, Anantharajupeta, Y.S.R. Kadapa, Andhra Pradesh, India

Corresponding Author:

K Sushma

PG Scholar, Department of Plant Pathology, College of Horticulture, Dr. Y.S.R. Horticultural University, Anantharajupeta, Y.S.R. Kadapa, Andhra Pradesh, India

Survey on incidence of gummy stem blight on ridge gourd [*Luffa acutangula* (L.) Roxb.] in Andhra Pradesh

K Sushma, T Nagalakshmi, K Arunodhayam, Syed Sadarunnisa and M Ramaiah

Abstract

Ridge gourd [*Luffa acutangula* (L.) Roxb.], is an important vegetable crop which is originated in sub-tropical asian region including India, which is affected by several fungal, bacterial and viral diseases. Recently a new disease (Gummy stem blight) is causing severe losses to the cucurbitaceous crops in different regions of Andhra Pradesh. A roving survey was conducted to assess the occurrence of gummy stem blight disease in two districts of Andhra Pradesh viz., Y.S.R. Kadapa and Kurnool districts during 2020- 2021. Results of the field survey indicated that mean per cent disease index was observed to be 20.23 per cent and 13.42 per cent respectively in Y.S.R. Kadapa and Kurnool districts. Per cent disease index was recorded maximum in Lakshmigariipalli village with 46.00 per cent and minimum was recorded in Boyarevula village with 8.50 per cent. The pathogen associated with gummy stem blight disease was isolated and proved Koch's postulates. This is the first report of *Didymella* sp. causing gummy stem blight on ridge gourd in Andhra Pradesh.

Keywords: Andhra Pradesh, gummy stem blight, ridge gourd, survey

Introduction

Ridge gourd [*Luffa acutangula* (L.) Roxb.], is an important vegetable crop which is originated in sub-tropical asian region including India (More, 2001)^[7]. It is popularly known as kalitori and belongs to the genus *Luffa* of cucurbitaceae family. Its chromosome number is $2n = 26$. Severe prevalence of gummy stem blight (GSB) in ridge gourd has been observed in recent years. Gummy stem blight is incited by the ascomycete fungal pathogen belonging to the genus *Didymella* (telomorph) or *Stagonosporosis/Phoma cucurbitacearum* (anamorph) which affects about 12 genus and 23 species of cucurbits, which represents a threat to the production of cucurbits in India (Mangala and Rajkumar 2018)^[5]. In India, this disease was first reported on chow-chow in Mysore (Sohi and Prakash 1972)^[10]. Symptoms of this disease can occur on foliage, stem or fruits. On leaves, symptoms initially appear as water-soaked lesions followed by chlorosis at the leaf margins. Chlorosis or yellowing of the leaf is followed by necrosis or formation of dark brown spots which progress inwards. The stem of plants develops blight/canker. The cankered portion produces brown coloured gummy or sticky ooze hence the name gummy stem blight. This ooze is known to contain the spores of the pathogen. Furthermore, fruits of affected plants tend to have a characteristic black, rotting appearance, thus this plant disease is also called black rot disease (Choi *et al.* 2010)^[3]. This study includes survey in Y.S.R. Kadapa and Kurnool districts of Andhra Pradesh to assess the severity of gummy stem blight.

Material and methods

Roving survey was conducted randomly to assess the severity of gummy stem blight disease in two districts of Andhra Pradesh viz., Y.S.R. Kadapa (three mandals) and Kurnool (four mandals) districts during 2020-2021 (Plate 1 and 2). Visual rating on leaf was scored by using (1-5) scale (Plate 3) (Zhang *et al.* 1997)

1 = 0% of the leaf area affected

2 = $\geq 1\%$ to 25% of the leaf area affected

3 = $\geq 25\%$ to $\leq 50\%$ of leaf area affected

4 = $\geq 50\%$ to $\leq 75\%$ of leaf area affected

5 = $\geq 75\%$ to $\leq 100\%$ of leaf area affected

Percent disease index (PDI) was calculated by using the following formula (Wheeler, 1969)^[14].

$$PDI = \frac{\text{Sum of disease ratings}}{\text{Total number of ratings} \times \text{Maximum disease grade}} \times 100$$

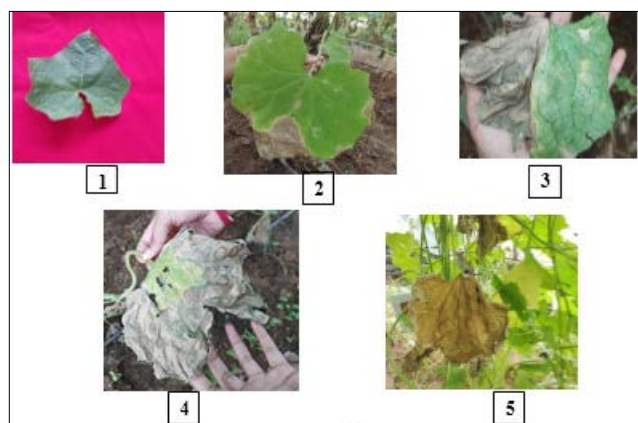
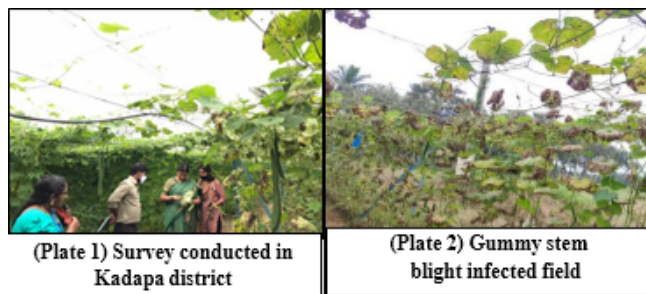


Plate 1: Disease assessment scale (1-5) given by Zhang *et al.* (1997)

1 = 0% of the leaf area affected, 2 = $\geq 1\%$ to $\leq 25\%$ of the leaf area affected, 3 = $\geq 25\%$ to $\leq 50\%$ of leaf area affected, 4 = $\geq 50\%$ to $\leq 75\%$ of leaf area affected, 5 = $\geq 75\%$ to $\leq 100\%$ of leaf area affected

Isolation and identification

Isolation of the pathogen was made from infected leaves collected from different mandals of Y.S.R. Kadapa and Kurnool districts. Infected sample washed under tap water and small bits of infected tissue about 3 mm along with some healthy tissue were cut with sterile scalpel. The bits were surface sterilized by dipping in 0.1% sodium hypochlorite for one minute, rinsed with sterile distilled water thrice, blot dried and then transferred aseptically on to the Petri plates containing solidified PDA medium. The inoculated Petri plates were incubated at $25 \pm 1^\circ\text{C}$ and observed periodically for growth of the fungus. After inoculation, colony growth was observed under microscope for the further identification of pathogen.

Results and discussion

Survey

A roving survey was carried out in ridge gourd fields of farmers during 2020-2021 to assess the severity of gummy stem blight (GSB) in two districts of Andhra Pradesh *viz.*, Y.S.R Kadapa and Kurnool. In Y.S.R Kadapa district three mandals and in Kurnool district four mandals were surveyed. In each mandal the villages were selected based on the crop availability.

Survey results divulged that, the disease severity varied considerably in two districts during October to February months in 2020-2021 (Table 1). Disease severity in surveyed locations ranged from 8.50 to 46.00 per cent in surveyed locations. Mean percent disease index was observed to be 20.23 per cent and 13.42 per cent respectively in Y.S.R. Kadapa and Kurnool districts. Highest mean per cent disease index was reported in Kodur mandal of Y.S.R. Kadapa district

with 24.71 per cent which was followed by Atmakur mandal of Kurnool district with 19.50 per cent. Highest severity of GSB disease was noted in Lakshmigariipalli village (46.00%) of Kodur mandal in Y.S.R. Kadapa district, followed by Abbinadupally village (42.00%) of Kodur mandal in Y.S.R. Kadapa district, whereas lowest per cent disease index was recorded in Boyarevula village (8.50%) of Velugodu mandal in Kurnool district.

In Y.S.R. Kadapa district, three mandals *viz.*, Kodur, Obulavaripalli, Chitvel were surveyed for per cent disease index of GSB disease in ridge gourd. Disease severity ranged from 11.00 to 46.00 per cent in surveyed locations. Maximum severity of GSB disease was observed in Lakshmigariipalli village (46.00%) in Kodur mandal followed by Abbinadupally village (42.00%) whereas minimum was recorded in Venkatreddypalli village (11.00%) of Kodur mandal.

In Kurnool district, four mandals *viz.*, Kothapally, Pamulapodu, Velugodu, Atmakur were surveyed. Per cent disease index of GSB disease ranged from 8.50 to 19.50 per cent. Highest per cent disease index was observed in Atmakur village of Atmakur mandal (19.50%) which was followed by Velugodu village with 17.55 per cent of Velugodu mandal and lowest was recorded in Boyarevula village (8.50%) of Velugodu mandal.

Variation of disease severity of gummy stem blight and yield loss in different surveyed locations of Y.S.R Kadapa and Kurnool districts attributed to the prevailing weather conditions, cropping pattern and crop stage. During the survey period, in Y.S.R. Kadapa district maximum per cent disease index was recorded in Lakshmigariipalli village (46.00%) which might be attributed to the Nivar cyclone which resulted in continuous rainfall for five days in the late November 2020. Favourable temperatures (20°C - 26°C), high relative humidity ($\geq 90\%$) resulted in growth and proliferation of the pathogen which completely devastated the crop with 40-50% of yield loss as the crop was at harvesting stage. Practice of monoculture of cucurbits was also observed which seems to have given fillip to the faster development and spread of the disease. Svedellus and Unestam (1978) ^[13] found that abundant dispersal of *Didymella* conidia and subsequent infection of leaves occur in the presence of free film of water and noted that higher relative humidity is necessary for further expansion of spots. (Sitterly, 1969) ^[11] earlier reported the impact of monoculture on incidence and development of GSB.

Minimum per cent disease index recorded at Boyarevula village (8.50%) of Velugodu mandal in Kurnool district and Venkatreddypalli village (11.00%) of Kodur mandal in Y.S.R. Kadapa district seems possibly due to proper crop rotation and phyto sanitary measures adopted by the farmers.

Occurrence of GSB disease on cucurbitaceous crops across the world has been reported by several scientists *viz.*, Sudisha *et al.* (2004) ^[12] on muskmelon in India, Basim *et al.* (2016) ^[2] on watermelon in Turkey, Ramsoondar *et al.* (2018) ^[9] on pumpkin in Trinidad and Al-Jubouri and Hussain (2020) ^[1] on watermelon in Iraq.

During survey, in addition to ridge gourd symptoms were observed on different cucurbitaceous crops *viz.*, ridge gourd, muskmelon, bottle gourd, bitter gourd, ash gourd. (Plate 4)

Collection, isolation and identification of the pathogen

The isolate of gummy stem blight pathogen was isolated by following standard tissue isolation method. The fungus isolated from the infected tissues was confirmed as *Didymella*

sp. based on their morphological, cultural and mycelial characters as described by (Li *et al.* 2015; Moumni *et al.* 2019 and Mahapatra *et al.* 2020) [4, 8, 6].

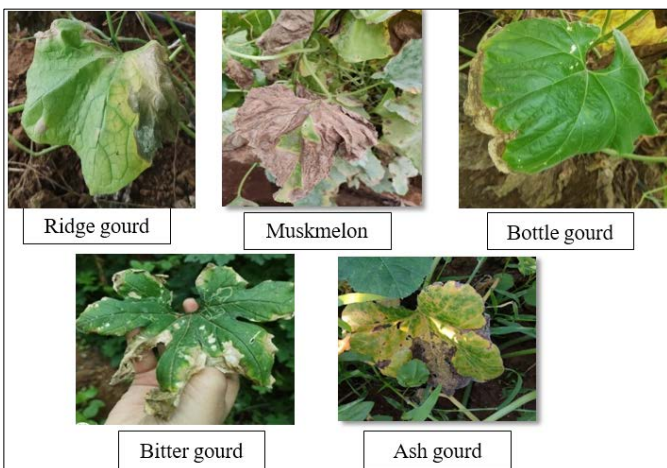


Plate 2: Symptoms of gummy stem blight observed on different cucurbitaceous crops

Conclusion

From the present investigation, it is concluded that the gummy stem blight disease caused by *Didymella* sp. was prevalent in all surveyed locations of Y.S.R. Kadapa Kurnool districts of Andhra Pradesh. This disease is causing a potential threat to cucurbitaceous crops.

Table 1: Prevalence of gummy stem blight of ridge gourd in Y.S.R. Kadapa and Kurnool districts of Andhra Pradesh during 2020-2021.

District in A.P.	Location		PDI
	Mandal	Village	
Kadapa	Kodur	Anantharajupeta	22.0
		Ragavarajupuram	18.50
		Lakshmigariipalli	46.00
		Venkatreddypalli	11.00
		K.R Kandriga	16.00
		Abbinadu Pally	42.00
		Gangavaram port	17.50
	Chitvel	Nagavaram	16.00
		Kothapalli	13.50
		Rachakondapalli	12.50
	Obularipalli	Obularipalli	14.00
		Obanapalli	13.50
		Yerravarikota	17.50
		B. Kammappalli	23.00
		Bommavaram	25.00
Kurnool	Kotha pally	Balreddypalli	15.75
		Yedurupadu	10.00
		Nagampalli	12.50
	Pamulapodu	Nandikunta	15.00
		Maddur	15.00
		Krishnanagar	12.25
	Velugodu	Abdullapuram	10.50
		Velugodu	17.55
		Boyarevula	8.50
		Atmakur	19.50

References

1. Al-Jubouri, Hussain. The First recording of Gummy Stem Blight Disease Caused by *Didymella bryoniae* (*Stagonosporopsis cucurbitacearum*) on Watermelon Crop in Iraq. *Annals of Tropical Medicine & Public Health* 2020;23(S16):SP231619.

2. Basim E, Basim H, Abdulai M, Baki D, Ozturk N. Identification and characterization of *Didymella bryoniae* causing gummy stem blight disease of watermelon (*Citrullus lanatus*) in Turkey. *Crop Protection* 2016;90:150-156.

3. Choi IY, Choi JN, Choi DC, Sharma PK, Lee WH. Identification and characterization of the causal organism of gummy stem blight in the muskmelon (*Cucumis melo* L.). *Mycobiology* 2010;38(3):166-170.

4. Li PF, Ren RS, Yao XF, Xu JH, Babu B, Paret ML *et al.* Identification and Characterization of the Causal Agent of Gummy Stem Blight from Muskmelon and Watermelon in East China. *Journal of Phytopathology* 2015;163(4):314-319.

5. Mangala KG, Rajkumar HG. Efficacy of Fungicides and Culture Filtrate of Native Bioagents against *Didymella bryoniae* Causing Gummy Stem Blight Disease in Gherkin. *International Journal of Pure and Applied Biosciences* 2018;6(1):1122- 1132.

6. Mahapatra S, Rao ES, Sandeepkumar GM, Sriram S, *Stagonosporopsis cucurbitacearum* the causal agent of gummy stem blight of watermelon in India. *Australasian Plant Disease Notes* 2020;15(1):7.

7. More TA. Cucurbitaceous vegetables in: *Textbook of Vegetables, Tuber crops and Spices* (eds. S. Thamburaj and N. Singh). Directorate of Information and Publications of Agriculture, ICAR, New Delhi. 2001, 238-319.

8. Moumni M, Mancini V, Allagui MB, Murolo S, Romanazzi G. Black rot of squash (*Cucurbita moschata*) caused by *Stagonosporopsis cucurbitacearum* reported in Italy. *Phytopathologia Mediterranea* 2019;58(2):379-383.

9. Ramsoondar, Judy, Da Silva, Cerano, Ramkissoon, Antonio *et al.* Gummy stem blight: an emerging epiphytotic disease of pumpkin in Trinidad, West Indies. *Tropical Agriculture* 2018;95:42-49.

10. Sohi HS, Prakash O. New records of fungal diseases from India. *Indian Journal of Mycology and Plant Pathology* 1972;2:139-142.

11. Sitterly WR. Effect of crop rotation on cucumber gummy stem blight. *Plant Disease Reporter* 1969;53:417-419.

12. Sudisha J, Vasanth Kumar T, Niranjana SR, Shekar Shetty H. First report of gummy stem blight caused by *Didymella bryoniae* on muskmelon (*Cucumis melo*) in India. *Plant Pathology* 2004;53(4):533-533.

13. Svedellus G, Unestam T. Experimental factors favoring infection of attached cucumber leaves by *Didymella bryoniae*. *Transactions of British Mycological Society* 1978;74:89-97.

14. Wheeler BEJ. *An introduction to plant diseases*. John Wiley and Sons Ltd., London 1969;62(3):617-619.