

## INTERNATIONAL JOURNAL OF TROPICAL AGRICULTURE

ISSN : 0254-8755

available at <http://www.serialsjournals.com>

© Serials Publications Pvt. Ltd.

Volume 36 • Number 3 • 2018

### Survey of Fusarium Wilt Disease in Major Tobacco Growing Areas of Northern Light Soils of Andhra Pradesh.

Santosh Swamy<sup>a\*</sup>, U Sreedhar<sup>bc</sup>, BSR Reddy<sup>a</sup> and K.R.S. Sambasiva Rao<sup>c</sup>

<sup>a</sup> Research Department, Agri Business Division, ITC Limited, Rajahmundry 533 103, Andhra Pradesh, India

<sup>b</sup> Central Tobacco Research Institute, Rajahmundry, A.P, India;

<sup>c</sup> Department of Biotechnology, Acharya Nagarjuna University, Nagarjuna nagar, Guntur, A.P., India

\* Corresponding author email- santuswamy@gmail.com

**Abstract:** Tobacco (*Nicotiana tabacum* L.) is the world's third most important commercial crop, after sugarcane (*Saccharum officinarum*) and cotton (*Gossypium hirsutum*). Wilt is one of the major diseases of tobacco and at national level the yield losses encountered due to Fusarium wilt was reported to the tune of 60 per cent. Fusarium wilt on tobacco was identified in Karnataka during 2000. Since then it has become a threat to tobacco cultivation. There were sporadic incidence of Fusarium reported in Northern Light Soils (NLS) so to find out the incidence levels Random field survey for Fusarium wilt disease in NLS region of Andhra Pradesh was conducted, survey revealed varying degrees of disease incidence during 2015-2017. Wilt incidence was recorded more in Koyalagudem with 29.17 and 36.36% during 2016 and 2017 respectively (Fig. 2). Tobacco fields showed wilt with severity in the range of 12.5 - 30%, 8.33 - 29.17% and 14.17 - 36.36% during 2015-2017 respectively

**Key words:** Fusarium, Wilt, Survey, Tobacco, NLS.

#### INTRODUCTION

Tobacco (*Nicotiana tabacum* L.) belongs to the family Solanaceae, is believed to be introduced into India from its native Central America by Portuguese in 1603. It is a major commercial crop of India, grown throughout the country. India is one of the principal

tobacco producing countries of the world and has attained its commercial importance in India. The genus *Nicotiana* encompasses over 66 species, out of which only two species, viz., *Nicotiana tabacum* L. and *Nicotiana rustica* L. are cultivated in India. *N. tabacum* is grown throughout the country, where as hardly

five to six per cent of total area under tobacco cultivation is accounted by *N. Rustica* varieties. Various types of tobacco grown in the country are mainly viz., FCV, natu, chewing, lanka, burley, bidi, hookah, cigar wrapper, cigar filler, snuff, cheroot and rustica. (Anon., 2014)

Fusarium wilt of tobacco was noticed during 2000 for the first time in Mysore KLS region of Karnataka by Shenoj and his coworkers of Central Tobacco Research Institute, Research Station, Hunsur, Karnataka, India and reported during 2002 (Shenoj *et al.*, 2002). A random field survey for Fusarium wilt disease carried out by them revealed that 20% of the total fields surveyed are affected by wilt disease (Anonymous, 2003). There were sporadic incidence of Fusarium reported in Northern Light Soils (NLS) so to find out the incidence levels Random field survey for Fusarium wilt disease in NLS region of Andhra Pradesh was conducted. Survey of diseases helps in understanding the occurrence, severity, spread and inoculum buildup of the pathogen. Martin and Johnston (1982) surveyed wheat fields to compare the occurrence and severity of Fusarium head blight and correlated them with cultural practices. According to Hwangl and Chang (1989) disease survey helps to assess the incidence and severity of the disease and also to identify the causal organism associated with the disease.

Survey is an important component of integrated disease management practices and will give an advanced knowledge regarding the potentiality of the disease and also will provide an idea of taking up necessary monitoring, preventive and management practices. Wilt caused by *Fusarium oxysporum* is a major constraint for production of FCV tobacco (Shenoj *et al.*, 2002). To know the further increase in the incidence and severity of wilt disease, a survey was carried out for a duration of three years during the present investigation.

## MATERIALS AND METHODS

A roving survey was conducted to find out the per cent incidence of fusarium wilt disease in FCV tobacco growing areas of East and West Godavari districts during 2014 -16. Survey was taken up for three growing seasons starting from November to February. There are 5 Tobacco Auction platforms (TAP's) by Tobacco board and 36 clusters in NLS Tobacco growing region. In the current study two villages were selected from each cluster and two fields were considered from each village for the survey covering an area of 30,000 ha.

Selection of the fields for the visit was done randomly. The number of fields visited and the number of fields showing wilt disease were recorded to calculate percentage of field exhibiting the disease. Disease incidence was also recorded by selecting 5 random spots per field and at each spot 20 tobacco plants were counted (Fig. 1). Then among these 100 plants, number of infected plants were noted down to calculate the percentage of disease incidence.

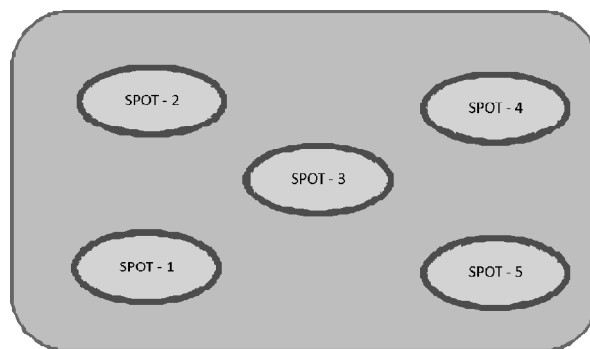


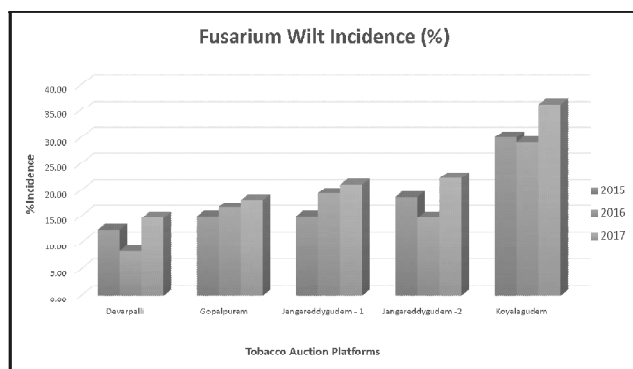
Figure 1

## RESULT AND DISCUSSION

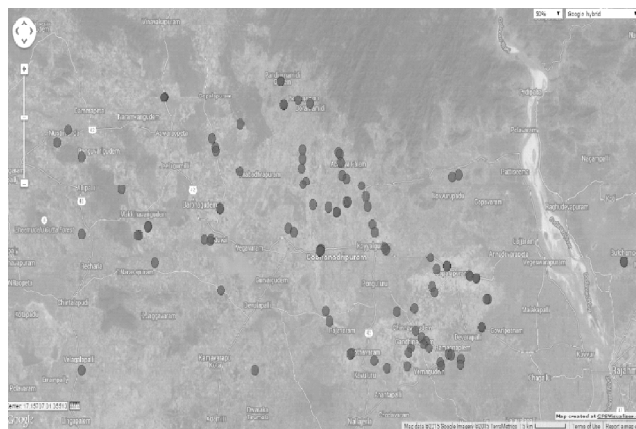
The total number of TAP's, clusters and villages surveyed is given in annexure 1. The details of tobacco fields visited and the fields exhibiting wilt are given in Table 2. Wilt incidence was recorded more in Koyalagudem with 29.17 and 36.36% during 2016 and 2017 respectively (Fig. 2). Tobacco fields showed wilt with severity in the range of 12.5 - 30%,

**Table 1**  
Details of Survey conducted

Years of Survey		2015	2016	2017
<b>Devarpalli</b>	Villages surveyed	16	18	17
	Fields visited	32	36	34
	Fields exhibiting wilt	4	3	5
<b>Gopalpuram</b>	Villages surveyed	10	12	11
	Fields visited	20	24	22
	Fields exhibiting wilt	3	4	4
<b>Jangareddygudem - 1</b>	Villages surveyed	20	18	19
	Fields visited	40	36	38
	Fields exhibiting wilt	6	7	8
<b>Jangareddygudem - 2</b>	Villages surveyed	16	17	18
	Fields visited	32	34	36
	Fields exhibiting wilt	6	5	8
<b>Koyalagudem</b>	Villages surveyed	10	12	11
	Fields visited	20	24	22
	Fields exhibiting wilt	6	7	8



**Figure 2: Fusarium Wilt incidence (%)**



**Figure 3: GPS locations for the survey carried out**

**Table 2**

**Wilt infestation (%) observed in the TAPs**

TAPs	2015 (%)	2016 (%)	2017 (%)
Devarpalli	12.50	8.33	14.71
Gopalpuram	15.00	16.67	18.18
Jangareddygudem - 1	15.00	19.44	21.05
Jangareddygudem - 2	18.75	14.71	22.22
Koyalagudem	30.00	29.17	36.36

8.33 - 29.17% and 14.17 - 36.36% during 2015-2017 respectively (Table 2).

For ease of identification each field was geo tagged with the GPS coordinates, the GPS locations shows the vast coverage of the fields across the NLS crop growing region (Fig. 3). Disease survey carried out in West and East Godavari (NLS) tract of Andhra Pradesh showed varied disease incidence. Similar random field survey was carried by Geiser *et al.*, (2005) and Wiebold (2001) and they observed the similar variation in the incidence of disease. The investigation on disease survey revealed variation in

**Annexure – 1**  
**List of all the TAP's, Clusters and Villages covered in Survey**

<i>TOBACCO AUCTION PLATFORM</i>	<i>CLUSTER</i>	<i>VILLAGE</i>	
<b>DEVARPALLI</b>	EAST GODAVARI	MIRTIPADU	
	BANDHAPURAM	CHERUKUMILLI	
	GANDHINAGARAM	BANDHAPURAM	
	SANGAIGUDEM	GANDHINAGARAM	
	SANAGAIGUDEM	SANGAIGUDEM	
	YARNAGUDEM	KRISHNAMPALAM	
	DEVARAPALLI	YARNAGUDEM DHUMANATHINIGUDEM DEVARAPALLI	
<b>GOPALPURAM</b>	GOPALAPURAM	RAJAMPALAM	
	CHITYALA	CHITYALA	
	VADALAKUNTA	KOMATIKUNTA	
	CHINNAIGUDEM	VADALAKUNTA	
	V.Ch. GUDEM	YADAVOLU YADHAVOLU CHINNAIGUDEM PEDDAPURAM V.Ch. GUDEM GOPALAPURAM	
	<b>KOYALAGUDEM</b>	POTHAVARAM	POTHUNEEDUPALAM
		POTHAVARAM	POTHAVARAM
		BAYYANAGUDEM	DHARMARAOPETA
KANNAPURAM		BAYYANAGUDEM	
DIPPAKAYALAPADU		ACHAIAHPALAM	
ANKALAGUDEM		KANNAPURAM MARIGUDEM DIPPAKAYALAPADU KOYALAGUDEM ANKALAGUDEM	
<b>JANGAREDDYGUDEM - 1</b>		REDDY GANAPAVARAM	REDDY GANAPAVARAM
	DORAMAMIDI	MUPPINAVARIGUDEM	
	NIMMALAGUDEM	DORAMAMIDI	
	SEETHAMPETA	RAMANNAGUDEM	
	BUTTAIGUDEM	NIMMALAGUDEM	

*contd. Annexure*

	SURAPUVARIGUEM	VEDHANTHAPURAM
	JANGAREDDYGUDEM -1	SEETHAMPETA
		KOMMAGUEDEM
		BUTTAIGUEDEM
		PANDIRIMAMIDIGUEDEM
		SURAPUVARIGUEM
		MARKANDEYAPURAM
<b>JANGAREDDYGUDEM - 2</b>	BRRAMPALEM	BORRAMPALEM
	KAMAIAHPALEM	P. ANKAMPALEM
	JEELUGUMILLI	KAMAIAHPALEM
	TADUVAI	P. ANKAMPALEM
	DHAMMAPETA	JEELUGUMILLI
	KRISHNAPURAM	TADUVAI
	CHALLAVARIGUEM	ROUTHUGUEDEM
	CHINNIVARIGUEM	CHINNAVARIGUEDEM
	ASHWARAOPETA	MUSTIBANDA
	MAKKINAVARIGUEM	T.NARSAPURAM
		KRISHNAPURAM
		CHALLAVARIGUEM
		CHINNIVARIGUEDEM
		VEDANTHAPURAM
		UTLAPALLI
		GANGINEEDIPALEM
		MAKKINAVARIGUEM

disease incidence over a period of 3 years (2015-2017). 10 isolates of *F. oxysporum* were successfully isolated and preserved using soil preservation and mineral oil overlay in the Research Department, ITC Limited, Agri Business Division, Rajahmundry.

### ACKNOWLEDGEMENTS

The paper forms a part of the PhD work of the first author and the facilities provided by Research Department, Agri Business Division, ITC Limited, Rajahmundry for the conduct of this study are sincerely acknowledged.

### REFERENCES

- Anonymous, (2004). Agriculture Situation in India. **6**: 527-538.
- Anonymous, (2005). Annual Report, All India Co-ordinated Research Project on Tobacco, CTRI, Rajahmundry. ICAR, New Delhi.
- Anonymous, (2014). Annual Report, All India Co-ordinated Research Project on Tobacco, CTRI, Rajahmundry. ICAR, New Delhi.
- Geiser, D. M., Lewis-ivey, M. L., Hakiza, G., Juba, J.H. and Miller, S.A. (2005). *Gibberella xylarioides* (anamorph *Fusarium xylarioides*) a causative agent of coffee wilt disease in Africa, is a previously unrecognized member of the *G. fujikuroi* species complex. *Mycologia* 97: 191-201.
- Hwangl, S.F. and Chang, K.F. (1989). Incidence and severity of root rot disease complex of field pea in northeastern Alberta in 1988. *Canadian Plant Disease Survey* 69: 139-141.

- Mallappa., (2007). Studies on frog eye leaf spot of bidi tobacco caused by *C. nicotianae* Ell. & Eve. *M. Sc. (Agri) Thesis*, Univ. Agric. Sci., Dharwad (India).
- Martin, R.A. and Johnston, H.W. (1982). Effects and control of fusarium diseases of cereal grains in the Atlantic Provinces. *Canadian Journal of Plant Pathology* 4: 210-216.
- Patel, B. N., Patel. H. R., Patel, P. M., Bhatt, N. A., Patel, K. D., Patel, J. G. and Patel, S. J., (2001). Assessment of avoidable yield loss due to frog eye disease in bidi tobacco. *Tob. Res.*, **27** (2): 187-189.
- Wheeler, B. E. J., (1969). An introduction to plant diseases. Jhon Wiley and Sons Ltd., London.
- Wiebold, B. (2001). Integrated Pest Management: Introduction to Crop Scouting, Plant Protection Programs. College of Agriculture, Food and Natural resources, IPM Manuals, University of Missouri, Extension Publishers, Columbia, 24pp.