

INCIDENCE AND MANAGEMENT OF YELLOW MOSAIC DISEASE OF BLACKGRAM TRANSMITTED BY WHITEFLY (*BEMISIA TABACI*) IN BUNDELKHAND REGION OF UTTAR PRADESH

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(Received 10 April 2022, Revised 28 May 2022, Accepted 6 June 2022)

ABSTRACT : Black gram is one of the major *kharif* pulse crop, threatened by yellow mosaic disease (YMD). Jhansi district was surveyed over two years, *kharif* 2018 and 2019 for occurrence of disease at farmer fields. The disease mean incidence and severity were low 2019 (23.50 & 16.50%) as compared to 2018 (29.41 & 22.0) growing season, respectively. The sole crop was severely affected by YMD as compared to intercropping with other crops. Twelve commercial blackgram varieties were screened against YMD under natural conditions and it was observed that four cultivar namely Pratap urd-1, Uttara, PU-31 and IPU-2-43 showed resistance reaction against YMD with disease severity range 4.20 to 5.0%. The variety T 9 (54.35%) and PU-40 (56.25%), highly affected by disease thus, showed highest susceptible reaction. Six insecticides (Fonicamid, Diafenthion, Imidachloprid, Acetamiprid, Thiamethoxam and Profenofos + Cypermethrin) were tested against YMD vector (whiteflies) in form of seed treatment (Imidachloprid and Thiamethoxam only) and foliar spray. All the tested chemicals were efficiently reduced the whiteflies population and it was observed that T₇ (Imidachloprid 70 WS@ 5g/Kg seed + spray of Imidachloprid 17.8 SL @ 0.05%) and T₈ (Thiamethoxam 30 FS @ 6g/Kg Seed + spray of Thiamethoxam 25 WG @ 0.3%) was found more effective, reduced YMD vector population 91.51 in 2018 and 89.89% in 2019. Lowest YMD mean severity was observed in T₇ and T₈ treatments with 6 and 8 (2018), 8 and 10% (2019), respectively. Whiteflies population reduction per cent with new insecticide Fonicamid (T₁) was found 89.34 in 2018 and 86.02 in 2019. The variety Pratap urd-1, Uttara, PU-31 and IPU-2-43 should be promoted for cultivation and Imidachloprid 70 WS@ 5g/Kg seed + spray of Imidachloprid 17.8 SL @ 0.05% was found to control whitefly population thereby disease occurrence.

Key words : Blackgram, disease incidence, insecticide, whiteflies and yellow mosaic disease.

How to cite : Adesh Kumar, Roomi Rawal, Nishi Roy, Hitesh Kumar, N. K. Bajpai, Narendra Singh, G. S. Panwar, Rekha Balodi, Malkhan Singh Gurjar, Anand Singh and Mukesh Sehgal (2022) Incidence and management of yellow mosaic disease of Blackgram transmitted by whitefly (*Bemisia tabaci*) in Bundelkhand region of Uttar Pradesh. *J. Exp. Zool. India* **25**, 1631-1638. DocID: https://connectjournals.com/03895.2022.25.1631

INTRODUCTION

Blackgram [*Vigna mungo* (L.) Hepper] is widely cultivated major *kharif* pulse crop in India. The grain are nutritionally rich with proteins (25-26%), carbohydrates (60%), fat (1.5%), minerals, amino acids and vitamins (Fary *et al*, 2000 and Karamany, 2006). India is the world's largest producer of blackgram and is being grown in about 50.31 lakh ha with a production of

32.40 lakh tons and productivity of 653 kg/ha (Anonymous, 2018a). Major blackgram growing states are Andhra Pradesh, Bihar, Karnataka, Maharashtra, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. In Uttar Pradesh, blackgram is cultivated in an area of 6.14 lakh ha with a production of 3.14 lakh tons (Anonymous, 2018a). In Jhansi district, blackgram is cultivated in 80,214 ha land with production

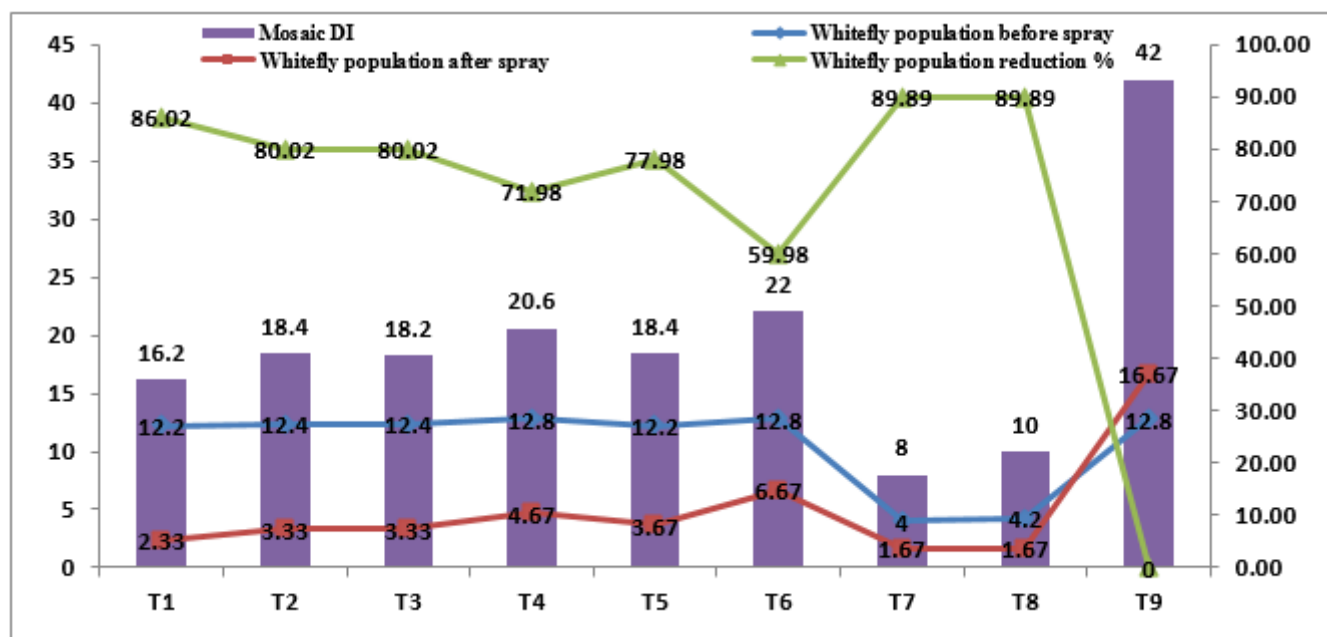


Fig. 4 : Insecticides evaluation under field conditions, YMD disease severity per cent and whiteflies population reduction per cent during 2019.

in different crops (Khutwal *et al*, 2002; Khattak *et al*, 2004; Mishra and Mukherjee, 2015; Somasunder *et al*, 2016; Naik *et al*, 2017). It will further validated in different villages and found effective to control vector population in this Bundelkhand region.

Our findings shows that 24 surveyed villages of district Jhansi have YMD incidence and would become a serious problem in future due to poor adoption of management practices by the farmers. The presented study will be helpful for farmers to manage the YMD and planting of resistant to moderately resistant variety during kharif season. The four varieties Pratap urd-1, Uttara, PU-31 and IPU-2-43 were found moderately resistant can be used for cultivation in Jhansi region. Additionally, seed treatment by Imidachloprid or Thiamethoxam and one foliar spray of same insecticides for control this disease under Jhansi district will protect from YMD infestation.

REFERENCES

- Alice D and Nadarajan N (2007) Pluses: Screening techniques and assesment for disease resistance. *All India Coordinated Research Project on MULLaRP-Tamil Nadu Agricultural University Kasturi Graphics and Printers, Coimbatore-24.*
- Anonymous (2018b) Sankhikya Patrika District Jhansi. Economics and statistics division state planning institute, planning department, Uttar Pradesh, Lucknow.pp. 37
- Anonymous (2018a) Pulses revolution from food to nutritional security. Crops Division Government of India Ministry of Agriculture & Farmers Welfare Department of Agriculture, Cooperation & Farmers Welfare Krishi Bhavan, New Delhi – 110 001. pp. 1-141
- Archana S, Venkatesh, Padmaja, A S, Nagaraju N and Manjunatha N (2018) Management of yellow mosaic disease (YMD) of blackgram (*Vigna mungo* L.) in Southern dry zone of Karnataka. *J. Entomol. Zool. Stud.* **6**(3), 860-863.
- Bandi H R K, Rao K N, Krishna K V and Srinivasulu K (2018) Screening of blackgram resistance to mungbean yellow mosaic virus under rice fallow. *Bull. Env. Pharmacol. Life Sci.* **7**, 125-128.
- Capoor S P and Varma P M (1948) Yellow mosaic of *Phaseolus lunatus*. *Curr. Sci.* **17**, 152–153.
- Ding J, Hong Li, Zhengqun Zhang, Jin Lin, Feng Liu and Wei Mu (2018) Thiamethoxam, Clothianidin and Imidacloprid Seed Treatments Effectively Control Thrips on Corn under Field conditions. *J. Insect Sci.* **18**(6), 1–8.
- Equbal M J, Sahni S, Singh D and Kumar B (2015) Exploitation of Urdbean Germplasm for Mungbean Yellow Mosaic Virus (MYMV) Management and Improved Seed Yield. *Int. J. Agric. Sci.* **7**(6), 536-539.
- Fary F L (2002) In: Janick J and Whipkey A (eds.). Trends in new crops and new uses, New opportunities in *Vigna*. pp. 424- 428.
- Jayappa, Ramappa H K and Devamani B D (2017) Management of Mungbean Yellow Mosaic Virus (MYMV) in Mungbean (*Vigna radiata* L.). *J. Entomol. Zool. Stud.* **5**(5), 596-601.
- Justin C G L, Anandhi P and Jawahar D (2015) Management of major insect pests of black gram under dryland conditions. *J. Entomol. Zool. Stud.* **3**(1), 115-121.
- Kalyan R K, Saini D P, Meena B M, Abhishek P, Pooja N, Shilpa V and Sonika J (2017) Evaluation of new molecules against jassids and whiteflies of *Bt* cotton. *J. Entomol. Zool. Stud.* **5**(3), 236-240.
- Karamany E L (2006) Double purpose (forage and seed) of mungbean production effect of plant density and forage cutting date on forage and seed yields of mungbean (*Vigna radiata*). *Res. J. Agric. Biol. Sci.* **2**, 162-165.
- Malathi V G and John P (2008) Gemini viruses infecting legumes. In: *Vegetable and pulse crops: Vol. 3. Characterization, diagnosis*

- and management of plant viruses. (eds. Rao G P, Kumar P L and Holguin-Pen˜a R J), USA: Studium Press LLC. pp. 97-123
- Mishra I O P and Mukherjee S K (2015) Field efficacy of new molecules on sap feeders of green gram, *Vigna radiata* (L.) Wilczek. *J. Eco-friendly Agric.* **10**, 153–156.
- Naik V C B, Kranthi S and Rahul V (2017) Impact of newer pesticides and botanicals on sucking pest management in cotton under high density planting system (HDPS) in India. *J. Entomol. Zool. Stud.* **5**(6), 1083-1087.
- Nariani T K (1960) Yellow mosaic of mung (*Phaseolus aureus* L.). *Indian Phytopathol.* **13**, 24–29.
- Pavishna M, Kannan R, Arumugam Pillai M and Rajinimala N (2019) Screening of blackgram genotypes against mung bean yellow mosaic virus disease. *J. Pharmacogn. Phytochem.* **8**(3), 4313-4318.
- Qazi J, Ilyas M, Mansoor S and Briddon R W (2007) Legume yellow mosaic viruses: genetically isolated begomoviruses. *Mol. Plant Pathol.* **8**, 343-348.
- Sethuraman L, Manivannan N, Natarajan S (2001) Management of yellow mosaic disease of urdban using neem products. *Legume Res.* **24**(3), 195-199.
- Shamim M Z and Pandey A (2014) Identification of yellow mosaic virus (YMV) resistant black gram (*Vigna mungo* L.) genotypes for cultivation in Northern India. *J. Agroeco. Nat. Reso. Manag.* **1**(2), 48-50.
- Somasunder U N, Kumar U and Prasad P R (2016) Studies on new seed dressing insecticides against insect pests of green gram. *Int. J. Agric. Innov. Res.* **4**, 1062–1063.
- Sundarara R P and Narayanasami C (2012) Impact of intercrops on insect pests of blackgram, *Vigna mungo* L. *J. Entomol.* **9**(4), 208-219.
- Srinivasaraghavan A and Lingwal S (2016) Field evaluation of urdban germplasm against Mungbean Yellow Mosaic India Virus in Northwestern Tarai region of India. *Int. J. Sci.: Basic Appl. Res.* **14**(2), 203-207.
- Swathi K, Seetharamu P, Dhurua S and Suresh M (2018) Efficacy of newer insecticides against sucking pests of rice fallow blackgram (*Vigna mungo* L.). *Indian J. Agric. Res.* **52**(6), 700-703.
- Thakur M P and Agrawal K C (1998) Management of yellow mosaic disease of urdban in Chhattisgarh region. *Indian J. Virol.* **14**, 85-87.
- Wang Z Y, Yao M D, Wu Y D (2009) Cross-resistance, inheritance and biochemical mechanisms of imidacloprid resistance in B-biotype *Bemisia tabaci*. *Pest Manage.* **65**, 118-1194.
- Williams F J, Grewal J S and Amin K S (1968) Serious and new diseases of pulse crops in India in 1966. *Pl. Dis. Report.* **52**, 300-304.
- Zhang P, Zhang X, Zhao Y, Wei Y, Mu W and Liu F (2016) Effects of imidacloprid and clothianidin seed treatments on wheat aphids and their natural enemies on winter wheat. *Pest Manage.* **72**, 1141–1149.