

Management of yellow mosaic disease in blackgram by non-chemical methods

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ABSTRACT

Field study was conducted to find out efficacy of plant products and bio control agent on yellow mosaic disease in black gram during 2001-2005. In the pooled mean analysis, neem seed kernel extract at 5% spray given at 25 and 50 days after sowing recorded lowest rate of yellow mosaic disease incidence and which was followed by neem oil spray at 3 % in the field trials conducted during 2001-05. The highest yield was recorded in seed treatment with *Pseudomonas fluorescens* at 10 g/ kg of seed and Soil application and foliar application at 1 kg / ha and which was followed by neem seed kernal extract and neem oil sprayed plots. The number of pods per plant was also higher in seed treatment with *P. fluorescens* applied plot and which was followed by neem oil treatment. However, neem oil 3 % spray at 25 and 50 days after sowing have significantly reduced white fly population and it is on par with the chemicals.

Key words : Yellow mosaic disease, Black gram, Plant products, Biocontrol.

INTRODUCTION

White fly transmitted gemini viruses (WTGs, genus Begomovirus, family Geminiviridae) have emerged as serious threat to the cultivation of crop plants in various parts of the world (Varma and Malathi, 2003). The yellow disease in black gram (Gemini virus) is most serious disease (Nene, 1972). The yield loss due to this virus have been calculated from 5- 100% (Nene, 1972). The virus could be transmitted by single whitefly. The initial symptoms of the yellow mosaic disease in black gram appear in the forms of irregular yellow patches of various sizes, which coalesce to form larger patches of bright yellow colour. This is accompanied with general stunting of plants. In severe cases almost entire leaves may turn yellow, plants bear few flowers and pods are smaller with immature seeds showing very poor germination. Synthetic pesticides have largely failed to address the problem of whitefly population in field. Several insecticides have been tested for the control of the vector, but following insecticides application, the vector had become tolerant to most insecticides (Cho *et al.*, 1984; Ramakrishnan *et al.*, 1984). In the present experiment attempts were made to control naturally occurring yellow mosaic virus in Black gram by plant extracts and bio control agents and compared with chemicals.

MATERIALS AND METHODS

The experiment was conducted in a randomized block design with four replications with a plot size of 4x 5 m using seeds of Co 5 black gram in rabi seasons during 2001-2005 at Agricultural Research Station, Kovilpatti under semiarid vertisols. The treatments adopted at 25 and 50 days after sowing (DAS) in the trails are as follows.

1. *Cyanodon dactylon* at 10 % leaf extract spray
2. *Prosopis juliflora* at 10% leaf extract spray
3. *Vitex negundo* at 10% leaf extract spray
4. *Pseudomonas fluorescens* as Seed treatment at 10 g/kg of seed and Soil application and foliar application @ 1 kg/ha
5. Neem oil at 3% spray
6. Neem seed kernel extract 5% spray
7. Methyl dematon at 200 ml/acre
8. Monocrotophos at 200 ml/acre
9. Control (water alone)

Preparation of plant extracts

For the preparation of plant extract in cold water, fresh leaf sample were collected and washed in tap water and sterile water. It was then processed with sterile distilled water at 1 ml per of tissue (1:1w/v) in a waring blender and filtered through a double layered cheese cloth. This formed standard solution (100 per cent). The extracts were further diluted for required concentration. Talc formulation of *P. fluorescens* pf1 strain was bought from Department

of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore and used in the study.

Pre spraying counts of the vector (Whitefly) were made one day before each foliar spray and post treatments counts were made at 1, 3, 5 and 7 days after each spray by random collection of 25 plants. Observations were also recorded on reduction of disease incidence, pod formation and seed yield per ac for each treatment in the study.

RESULTS AND DISCUSSION

The losses due to virus disease can be avoided by some preventive measures. Use of plant products and bio control agents in plant protection is a recent and ecofriendly strategy. All the treatments were superior to untreated control, which recorded the highest score for yellow mosaic disease (Table 1). Among the treatments imposed, methyl dematon sprayed plots had lesser yellow mosaic disease incidence in all the three years (2002-05), they was on par with monocrotophos, neem oil and neem seed kernel extract in 2002-03, with monocrotophos and neem oil in 2003 -04 and with monocrotophos in 2004 -05. However, neem oil and neem seed kernel extract also found to be better in reducing the disease incidence during 2004-05.

The analysis of pooled data indicated that the chemicals viz., monocrotophos and methyl dematon were superior in reducing the disease incidence. However, neem seed kernel extract at 5% spray given at 25 DAS and 50 DAS was superior and registered lowest score for yellow mosaic disease and which was followed by neem oil applied at 25 DAS and 50 DAS as non chemical methods. These treatments were on par with seed treatment with *P. fluorescens* at 10 g per kg of seed and soil application and foliar application at 1 kg /ha sprayed plot and were significantly superior to other treatments. The least control was observed with the treatment involving 10% leaf extract spray of *P. juliflora*. Prevention of virus diseases of various crops, employing antiviral agents from non host plants has been described earlier (Verma *et al.*, 1985). Saxena and Khan (1985) reported that neem (*Azadirachta indica*) seed oil at 50 % was found highly effective in reducing the survival of brown planthopper, *Nilaparvata lugens* and in suppressing transmission of grassy stunt and ragged stunt viral diseases of rice. *P. fluorescens* CHAO strain induced systemic protection against tobacco necrosis virus in tobacco (Maurhofer *et al.*, 1994).

With respect to yield, highest yield was observed with seed treatment with *P. fluorescens* at 10 g per kg of seed and Soil application and foliar application at 1 kg/ha spray and was significantly ($P < 0.05$) superior to other treatments. This was followed by neem seed kernel extract 5% spray. The lowest yield among the treatments was recorded by *P. juliflora* at 10% leaf extract spray. However all the treatments were superior to the control uninoculated plot. The