



RESEARCH ARTICLE

# Effects of fungicides, plant extracts and bio agent on downy mildew of isabgol (*Plantago ovata* Forsk.)

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## ABSTRACT

Isabgol (*Plantago ovata* Forsk.) is important medicinal plant. Isabgol crop suffers a lot due to fungal diseases. Among all diseases, downy mildew caused by *Peronospora plantaginis* Underwood is the most important and wide spread disease, which appears in severe form every year and causes extensive damage to the crop. Therefore, *in vivo* evaluation of eight fungicides, phytoextracts, and one bio-agent for management of downy mildew disease was carried out which revealed that, seed treatment (ST) with Metalaxyl (3g/kg seed) followed by three foliar sprays of Metalaxyl MZ (0.1 %) at 15 days interval initiating from appearance of disease was the most effective treatment with the least disease intensity (10.76 %) and yield increased by 26.02 per cent over control, followed by Fosetyl-AI (0.2 %) and Copper oxychloride (0.2 %) which recorded 14.00 and 15.25 per cent disease intensity with 18.01 and 16.42 per cent increase in yield over control, respectively.

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## INTRODUCTION

Isabgol (*Plantago ovata* Forsk.) crop suffers a lot due to fungal and bacterial diseases, but fungal diseases are predominant. Damping-off of seedlings, wilt, downy mildew and powdery mildew are the major fungal diseases. Among these, downy mildew is the most important and wide spread disease which appears in severe form every year and causes extensive quantitative as well as qualitative damage to the crop and makes the cultivation of isabgol crop unprofitable (Rathore and Pathak, 2002). Downy mildew causes considerable reduction in seed yield and yield attributes of isabgol. It is reported to be caused by *Peronospora alta* Fuckel (Kapoor and Chowdhary, 1976), *Pseudoperonospora plantaginis* Underwood and *Peronospora plantaginis* Underwood (Desai and Desai, 1969). *Peronospora plantaginis* is a commonly prevailing pathogen of isabgol downy mildew in Gujarat.

## MATERIALS AND METHODS

Field experiment for management of downy mildew of isabgol was conducted at BACA, AAU, Anand in Randomized Block Design (RBD) with 12 treatments each replicated thrice. Sowing of GI-2 variety as susceptible in all plots was carried out by drilling method with seed rate 4 kg/ha and spacing 30 × 5 cm in previously opened and fertilized furrow. For even distribution of the seeds in the furrows, seeds were well mixed with sand. After drilling of seeds, the debris of infected plants of isabgol containing oospores were drilled in the same furrow for providing a source of inoculum and then covered with soil. Finally each plot was irrigated carefully. Management of downy mildew of isabgol was carried out with common seed treatment of Metalaxyl (Apron 35 SD) @ 3 g/kg seeds followed by foliar sprays of seven fungicides [*i.e.* Metalaxyl MZ (Ridomil MZ 72 WP) @ 0.1 %, Copper oxychloride (Blitox 50 WP) @ 0.2 %, Fosetyl – AI (Aliette 80 WP) @ 0.2 % Mancozeb