

Management of aonla rust (*Ravenelia emblicae*) using fungicides and biocontrol agents

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Abstract

Studies were conducted to select the effective fungicides and biocontrol agents for the management of Aonla rust. Two spraying of fungicides and biocontrol agents were given at 20 days interval. The results showed that the disease intensity was 18.6% in mancozeb treatment as against 52.4% in the control. This was followed by chlorothalonil (0.2%) and copper oxychloride (0.4%) which recorded 21.4% and 24.3% disease intensity respectively. The second year confirmation trial showed that PDI was low in treatment Chlorothalonil (13.6) followed by Copper oxychloride (17.3), Mancozeb (19.6). In case of bioagents, *T. viride* recorded PDI of 34.7, *Pseudomonas flourescens* (27.7) as compared to untreated plants recording PDI of 41.7.

Key words : biocontrol agents, fungicides, PDI, aonla

Introduction

Aonla is an important economic fruit tree which come up very well in vertisols even under rainfed conditions. Rust incited by *Ravenelia emblicae* Syd. is a serious and economically important disease in aonla not only in Tamil Nadu but also in other states like Uttar Pradesh and Rajasthan. It was first observed in Rajasthan by Tyagi (1967). Subsequently, it has been observed in Rehmankhera farm, Lucknow (UP) and Rajgarh area of Pratapgarh by Misra, (1988). In India, Rawal (1993) has observed that this causes considerable loss in major aonla growing tracts of Uttar Pradesh. The leaflets show conspicuous rust pustules. On the fruits, blackspots appear which sometimes cover the entire surface of the fruits. Affected fruits may drop before maturity. Plants with a severe attack on fruits show no symptoms on the leaves and vice-versa (Tyagi, 1967). Sometimes, ring rust appears as circular or semi-circular, reddish solitary or gregarious spots on leaves from the beginning of January month. (Chundawat, 1990). Therefore, there is severe loss in foliage as well as in fruits, which are rusted. Owing to expansion of aonla orchards, working out of management strategies is also equally important to sustain the yield and quality of aonla fruits

and hence the present study was conducted with an objective to screen out suitable fungicides and biocontrol agents for the management of aonla rust.

Materials and methods

The study was conducted for a period of two years at Regional Research Station (RRS), Aruppukottai of Tamil Nadu Agricultural University. Aonla trees available in the horticultural crops block at RRS, APK were frequently examined for rust disease initiation. Field experiment was conducted during 2000-2002 for the management of Aonla rust using fungicides, plant extracts and biocontrol agents (T_1 - Mancozeb(0.3%), T_2 - Topsin M (0.1%), T_3 -Copper oxychloride (0.4%), T_4 -Chlorothalonil (0.2%), T_5 -Triademefon (0.1%), T_6 -Triademorph (0.1%), T_7 -Sulphur (0.3%), T_8 -*Prosopis julifera* (10%), T_9 -*Trichoderma viride* (5g/l) and T_{10} -*Pseudomonas flourescens* (10g/l). Two trees per replication were maintained for each treatment. From each tree, 15 leaves from top, middle and bottom were selected for recording the observations on disease intensity. Modified cobb's scale (1-7grade) was used to record the disease intensity. Two rounds of spraying, one at the initiation of disease and another 20 days after first spraying were given. The disease intensity was recorded 20 days after the last spray. The second year field experiment was conducted during 2002-2003 to confirm the efficacy of treatments. Per cent disease index (PDI) was worked out following 0-7 scale (Pathak, 1984).

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Results and discussion

The commercially cultivated cultivars of aonla are susceptible while cvs Kanchan, NA-6 and NA-10 showed moderately susceptible under Jobner of Rajasthan conditions. Rust disease in this crops could be effectively managed when the integrated approaches are followed. Proper sanitation and clean cultivation of aonla are the basic requirements to avoid this disease. However, fungicides play important role for the better management of rust. In present investigation, field valuation of some of the common fungicides and bioagents showed differential response. Results presented in Table I reveal that spraying two times with mancozeb (0.3%) was highly effective in reducing the rust disease intensity. The disease intensity was only 18.6% in this treatment as against 52.4% in unsprayed control. This was followed by chlorothalonil (0.2%) and copper oxychloride (0.4%), which were also recorded 21.4% and 24.3% disease intensity respectively. The use of biocontrol agent viz., *T. viride* at the rate of 5g/l (41.4) and the plant extract viz., *P. julifer* (40.5) at the rate of 10% were effective in reducing the disease. The disease

Table 1. Comparative efficacy of management of aonla rust

Treatment	Mean PDI	
	2001-02	2002-03
Mancozeb (0.3%)	18.6	19.6
Topsin M (0.1%)	26.6	22.5
Copper oxychloride (0.4%)	24.3	17.3
Chlorothalonil (0.2%)	21.1	13.6
Triademefon (0.1%)	31.9	20.6
Triademorph (0.1%)	30.9	25.6
Sulphur (0.3%)	33.8	26.2
<i>Prosopis julifera</i> (10%)	40.5	36.6
<i>Trichoderma viride</i> (5g/l)	41.4	34.7
<i>Pseudomonas flourescens</i> (10g/l)	33.3	27.7
Control	52.4	41.7
CD (P=0.05%)	2.1	5.1

intensity in this treatment was 41.4 and 40.5% respectively. In the second year experiment (2002-2003) using the same treatments showed that PDI was low in treatment Chlorothalonil (13.6) followed by Copper oxychloride (17.3), Mancozeb (19.6). In case of *T. viride* (34.7), *Pseudomonas flourescens* (27.7) and untreated plot showed (41.7) in table1. Similar results was obtained in Jobner, chlorothalonil (Kavach 75wp) (0.1%) and Triademefon (Bayleton 25 wp) at (0.05%) 10 days interval reduced the Aonla rust in Jaipur on the basis of Cost:Benefit ratio, spraying of chlorothalonil

(0.2%) at 15 days interval was found most effective control for aonla rust followed by six sprays of chlorothalonil (0.2%) at 10 days interval. (Jat, 1999).

However, Tyagi and Pathak, (1988) showed that monthly sprays of wettable sulphur (0.5%) or zineb (0.2%) during July-September can be advocated to check further spread of this disease. Subsequently, the most promising results for the control of *R. emblica* var. *pinnulae* and *R. emblica* var. *fruticulae* on *E. officinalis* (*Phyllanthus emblica*) were given by elosal (sulfur) dust and ultra sulfur. Research works carried out under the AICRP on arid zone fruits revealed that out of nine cultivars of aonla screened under Faizabad (UP) conditions, cultivar NA-6 was found to be resistant. In general, no genotype was found immune against rust. (Anonymous, 2002). In southern India, some of the aonla cultivars showed moderate susceptibility to this disease. However, they are not commercially important so far (Anonymous, 1989). Therefore, such wild species conferring resistance can be explored for the development of rust resistant genotypes through breeding programme in addition to the usage of mancozeb (0.3%) or chlorothalonil (0.2%) as evidenced from present study.

References

- Anonymous, 1989. Epidemiological studies In: Annual Report, All India co-ordinated research project on Arid zone fruits. Pp.161.
- Anonymous, 2002. Epidemiological studies, In: Annual Report, All India coordinated research project on Arid zone fruits. Pp.161.
- Chundawat, B.S. 1990. Cultivation practises of arid fruit species. In Book : Arid fruit culture. Oxford and IBH publishing co. Pvt. Ltd., pp. 110-118.
- Jat, R.G.1999. Biennial report, Tenth group workers meeting AICRP on AZF, pp119-200.
- Misra, A.K.1988. Studies disease of fruit crops. Annual Report CIHNP, Lucknow.
- Pathak, V.N. 1984. Laboratory manual of plant pathology. Oxford and IBH publishing co. New Delhi, Pp. 216.
- Rawal, R.D 1993. Fungal diseases of tropical fruits spp. In: Chadha, K.L. and Pareek, O.P. (Eds.), *Advances in Horticulture, fruit crops*, Vol.3 Malhotra Publ. House, New Delhi, pp. 1255-1273.
- Tyagi, R.N.S and A.K.Pathak.1988. Control of aonla (*Emblia officinalis* Gaerth) rust (*Revenelia emblica* Syd.) through fungicides. *Indian Journal of Mycology and Plant Pathology*.17(2) : 218-219.
- Tyagi, R.N.S. 1967. Morphological and taxonomical studies on the genus *Ravenelia* Berk. occurring in Rajasthan. Ph.D. Thesis, University of Rajasthan, Jaipur.