ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 9, Issue, 04, pp.49622-49626, April, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

INSECT PESTS AND DISEASES OF FRUITS / SEEDS OF *BUCHANANIA LANZAN* AND THEIR MANAGEMENT

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ARTICLE INFO

Article History:
Received 17th January, 2017
Received in revised form
10th February, 2017
Accepted 22nd March, 2017
Published online 30th April, 2017

Key words:

Fruits,
Seeds,
Insect pests,
Diseases,
Buchanania lanzan,
Management.

ABSTRACT

Buchanania lanzan plants suffer damage by biotic factors like grazing, hacking, repeated fire, indiscriminate harvesting (lopping and cutting), insect and diseases attack which adversely affect the growth and productivity. This economically important tree species were susceptible to damage several insect pests and diseases. Experiments on effect of chemicals on fruits yield of *B. lanzan* for control of insect pests and diseases were laid out in natural stand and during seed storage. The studies revealed that spraying of combination of chemicals- endosulfan 0.07% + bavistin 0.2% + alpha NAA 40 ppm were found to be most effective. But the endosulfan has now banned and therefore the second alternative treatment i.e. monocrotophos 0.04% + bavistin 0.2% + alpha NAA 40 ppm was also found to be most effective for the production of inflorescence / fruits and protection against sap suckers i.e. thrips, *Rhipiphorothrips* spp. and diseases of *B. lanzan*. Seed mycoflora *Aspergillus* spp. and *Rhizopus nigricans* (Ehn.) in storage were also studied. The protein, carbohydrate and oil percentages were comparatively less in infected seeds as compared with the healthy seeds. Fungicide, dithane M-45 0.1% superior control and exhibited 4.06% protein content and 47.58% oil content.

Citation: Meshram, P. B. and Soni, K. K. 2017. "Insect pests and diseases of fruits / seeds of *buchanania lanzan* and their management", *International Journal of Current Research*, 9, (04), 49622-49626.

INTRODUCTION

Chironji, (*Buchanania lanzan* Spreng.) is an economically important forest tree species of central India. Seeds are used as an expectorant, tonic to the body and brain. The flesh of ripe fruits and kernels are edible and fetch quite high rate, it is used for substituting almonds in flavouring sweetmeats, confectionary and betel nut powder. The root is used for removing kapha, biliousness and also cures blood diseases. The juice of leaves is digestive, expectorant and purgative (Anon. 1952). Due to indiscriminate cutting and lopping of branches attract fungal infestation followed by insect pest attack. The species is susceptible to various insect pests and diseases which adversely affects the growth and productivity. Premature fruit drop was also noticed which indicates the possible deficiency of certain hormones and chemicals with increasing age of the plants. Beeson 1941, Mathur and Singh, 1954, Bhasin *et al.*, 1958, Browne, 1968, Booth, 1971, Sahai and Mehrotra, 1982, Vijiayan, 1991, Joshi 1992, Neelay *et al*., 1983, Singh *et al*., 2002, Meshram and Nandeshwar, 2003, Soni *et al.,* 2005 and Dadwal and Singh, 2007 made important contribution in studies of pest and diseases of *Buchanania lanzan*.

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However, little information is available on the intensity of the pest attack and its impact on productivity. Therefore, the present study was undertaken to highlight the impact of pests and their management in *B. lanzan*.

MATERIALS AND METHODS

Material and methods are described separately for each experiment under brief experimental title as follows:

Effect of chemicals on fruits yield of *B. lanzan*

Experiment was carried out in Randomized Block Design (RBD) with three replications in natural stand of *B. lanzan* at Batkakhapa, East Forest Division, Chhindwara, Madhya Pradesh. In all 9 treatments viz. T_1 Monocrotophos 0.04% + alpha NAA 40 ppm, T_2 Endosulfan 0.07% + alpha NAA 40 ppm, T_3 Bavistin 0.2% + alpha NAA 40 ppm, T_4 Monocrotophos 0.04% + Bavistin 0.02% + alpha NAA 40 ppm, T_5 Endosulphan 0.07% + Bavistin 0.02% + alpha NAA 40 ppm, T_6 Alpha NAA 40 ppm, T_7 Neem oil + Bavistin 0.02% + alpha NAA 40 ppm, T_8 Neem oil 0.5% and T_9 Control (Untreated) were taken. Concentrations on the basis of their active ingredients were sprayed on the plants with the help of

power sprayer (motorized ASPEE BOLO). Pre-treatment observations in respect of the number of inflorescences and number of fruits per panicle were recorded. At the time of harvesting of healthy fruits, total number of fruits produced by plant was counted separately and weighed and subjected to statistical analysis.

Mycoflora associated with seeds, germination, testing of protein, carbohydrate, oil and effect of different fungicidal treatments on oil and protein contents of *B. lanzan* under storage condition

Seeds of *B. lanzan* were collected from Batkakhapa, East Forest Division, Chhindwara, Madhya Pradesh during May, 2009. Seed mycoflora was screened by the standard moist blotter method (ISTA, 1985). The mycoflora was extracted in Potato Dextrose Agar (PDA) media in petri-dishes of 15 cm diameter and incubated at 28°C ± 2°C in BOD incubator. The fungi associated with the seeds were recorded and identified under stereo-binocular microscope with the help of relevant literature.

The germination of seeds was also recorded. In another experiment seeds of *B. lanzan* were kept in moist petri-dishes at 80-90 per cent relative humidity for 21 days for full fungal infestation. The growth of fungal flora was washed by keeping the seeds in sieves under running water. After washing, the seeds were first dried in open sun and later kept at 40-50°C in incubator for complete drying. The healthy dried seeds as well as infected and dried seeds were subjected to solvent extraction by Soxhlet Apparatus using petroleum ether (60-80°C boiling point) for extraction of oil. Protein, oil and carbohydrate of healthy and damaged seeds of *B. lanzan* were got tested from the laboratory of Non Wood Forest Produce Division, Tropical Forest Research Institute, Jabalpur. The data on per cent incidence of different insect pests and diseases recorded were converted using suitable transformation methods (Gomez and Gomez, 1984).

The data was subjected to suitable analysis of variance (ANNOVA) and critical difference (CD) were calculated by computer programme SX Statis PC DOS version 2.0, copyright @ 1985, 1987, NH analytical software for comparing the efficacy of the treatments.

RESULTS AND DISCUSSION

Effect of some chemicals for production of ripe fruits of *B. lanzan*

Mean number of ripe fruits produced and weight of fruits per flowered plant is summarised in Table 1. Maximum fruit produced and weight of fruits per panicle was recorded in treatment (T5) endosulfan 0.07% + Bavistin 0.2% + alpha NAA 40 ppm (188.00 and 93.93 gm) followed by treatment (T4) monocrotophos 0.04% + Bavistin 0.2% + alpha NAA 40 ppm (166.66 and 80.13 gm). In control (T9) only 84.00 and 40.00 gm fruits per panicle were recorded. All the treatments show significant results when compared to control.

Mycoflora associated with seeds, germination, testing of protein, carbohydrate, oil and effect of different fungicidal treatments on oil and protein contents of *B. lanzan* under storage condition

The results presented in Table 7 (a) reveals that in four fungal species viz. *Aspergillus niger, A. flavus, Rhizopus nigricans* and *Fusarium pallidoroseum* on the seeds of *B. lanzan* and germination of seeds varies from 11.41 to 41.91 per cent and 4.83 to 7.23 per cent respectively. The highest incidence of fungi (41.91 per cent) and lowest germination (0.00) recorded in *R. nigricans* followed by *A flavus* (30.00 per cent) and *F. pallidoroseum* (4.83 per cent) germination. It is evident that there was predominance of *A. niger, A. flavus* and *R. nigricans* which were found commonly associated with the seeds under study.

Table 1. Status of insect pests and diseases of fruits/seeds of *B. lanzan*

Insect pests and diseases		Status	Nature of damage
Common Name	Scientific Name		
Thrips	*Rhipiphorothrips* spp.	Major	Suck the sap from the inflorescences/immature fruits.
Angoumois grain moth	*Sitotroga cerealella* (Oliv.)	Minor	Larva spins silk profusely & prepares small silken tubers among kernels.
Lesser grain borer	*Rhyzopertha* dominica (F.)	Minor	Grubs/Beetles make large regular holes in the kernels & break up of kernels.
Seed Mycoflora	*Aspergillus flavus* (Link ex. Fr.,) *A. niger* (Van Teighem)and *Rhizophus nigricans* (Ehn)	Major	Seed deterioration during storage.

Table 2. Effect of some chemicals for the production of fruits of *B.lanzan*

Treatments	Mean no. of ripe fruits / panicle	Mean Wt. of ripe fruits / panicle (g)
T_1. Monocrotophos 0.04% + alpha NAA 40 ppm	133.33	63.06
T_2. Endosulfan 0.07% + alpha NAA 40 ppm	162.66	77.73
T_3. Bavistin 0.2% + alpha NAA 40 ppm	148.00	71.46
T_4.Monocrotophos 0.04% +Bavistin 0.2% + alpha NAA 40 ppm	166.66	80.13
T_5.Endosulfan 0.07% +Bavistin 0.2% + alpha NAA 40 ppm	188.00	93.93
T_6. Alpha NAA 40 ppm	125.33	58.26
T_7. Neem Oil + Bavistin 0.2% + alpha NAA 40 ppm	144.33	66.66
T_8. Neem Oil 0.5%	121.33	59.33
T_9. Control (Untreated)	84.00	40.00
SEm ±	5.45	2.80
CD at $p = 0.05$	11.87	6.14

Table 3(a). Mycoflora associated with seeds and germination

Fungi	Aver.% incidence	Aver. % germination
Aspergillus niger	15.00	5.0
A.flavus	30.00	7.23
Rhizopus nigricans	41.91	0.0
Fusarium pallidoroseum	11.41	4.83

Table 3 (b): Testing of oil, carbohydrate and oil contents in seeds of *B. lanzan*

Seeds	Protein (%)	Carbohydrate (%)	Oil (%)
Healthy Seeds	4.06	3.98	47.58
Damaged Seeds	3.92	7.6	41.14

Table 3 (c): Effect of different fungicidal treatments on oil and protein contents of *B. lanzan* seeds under storage condition

Treatment	Protein (%)	Oil (%)
T_1.Dithane 0.1%	4.06	47.58
T_2. Bavistin 0.1%	4.02	46.35
T_3. *Trichoderma viride* 5%	4.01	44.35
T_4. Control (Untreated)	3.92	41.14

Fig.1: Spraying of chemicals by power sprayer

Fig. 2: Healthy ripe fruits of *B. lanzan*

Fig. 3. Larva of *Sitotroga* sp. feeds on kernel of *B. lanzan*

Fig.4: Seed borer *Rhizopertha* sp.feeds on kernels

Table 7 (b) reveals that protein, carbohydrate and oil percentage were comparatively less in infected seeds as compared to the healthy seeds. Table 7 (c) reveals that out of three fungicide applications, dithane M-45 0.1% showed comparatively superior control and exhibited 4.06% protein content and 47.58% oil content. Present finding reveals that all the fungicides treated seeds exhibited positive response as compared to untreated seeds. The ability of saprophytic fungi to occur in higher percentage may be due to rapid germination of spores, quick hyphal invasion, high competitiveness in nature and their ability to utilize a wide variety of seed contents (Mohammad Ali and Sharma, 1976). Occurrence of various species of *Aspergillus* on the forest tree seeds has been reported by earlier workers (Mittal 1979, Neelu Singh *et al.,* 2004, Sahai and Meharotra 1982, Kirti Joshi *et al*., 2004, Vijayan 1991). Jamaluddin *et al.,* (1985) and Sharma and Jain (1981) did not observe any significant difference in oil contents when the properly dried seeds are stored in air tight containers. Thus, seeds should be properly stored in order to prohibit the activity of fungi responsible for seed deterioration.

Conclusion

The studies revealed that spraying of combination of chemicals- endosulfan 0.07% + bavistin 0.2% + alpha NAA 40 ppm were found to be most effective. But the endosulfan has now banned and therefore the second alternative treatment i.e. monocrotophos 0.04% + bavistin 0.2% + alpha NAA 40 ppm was also found to be most effective for the production of inflorescence / fruits and protection against sap suckers i.e. thrips, *Rhipiphorothrips* spp. and diseases of *B. lanzan*. The protein, carbohydrate and oil percentage were comparatively less in infected seeds as compared with the healthy seeds. All the fungicide treated seeds exhibited positive response in comparison with untreated seeds.

Acknowledgement

Authors are thankful to Dr. U. Prakasham, IFS, Director and Shri P. Subramanyam, IFS, Group Co-ordinator (Research), Tropical Forest Research Institute, Jabalpur for providing the necessary facilities for carrying out this study. Encouragement financial support from ICFRE, Dehradun is also acknowledged. PI also grateful to the Divisional Forest Officer, East Forest Division, Chhindwara and staff for providing the necessary field facilities during the course of study.

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