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CONTROL OF ANGUINOSIS OF WHEAT USING PLANT EXTRACTS

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Leaf extracts from *Azadirachta indica, Vinca rosea* and *Jatropha curcas* were applied in microplots to evaluate their efficacy against wheat gall nematode, *Anguina tritici* (Steinbuch 1799) Filipjev 1936. After 12 weeks, the number of cockles was zero in the plants treated with *Azadirachta indica* and *Vinca rosea.* In the plants treated with *Jatropha curcas,* the number of cockles was 10/plant whereas in control their number was 13/plant.

Key words: Anguinosis, Plant extracts, *Anguina tritici,* Wheat.

INTRODUCTION

Toxic chemicals have long been used to control agricultural and domestic pests. However, due to plant resistance, toxicity environmental risks etc. alternate methods of pest control are currently being studied. Biocontrol through the use of various plant extracts is emerging because herbal or botanical control does not involve the risks to the environment as does chemical pesticide use. Pakistan has an abundant supply of anthelminthic (nematicidal) plants which are not utilized extensively. Neem (*Azadirachta indica* Juss.) for example is a plant abundantly found in Pakistan which could be utilized in controlling agricultural pests.

There are already a large number of references where plant resources have been used to control parasitic nematodes. Oostenbrink *et. al.* [1] indicated that population of *Pratylenchus* sp. and *Tylenchorhynchus dubius* was greatly reduced in soil after growing marigold for one season. Oostenbrink [2] reported that *Tagetes patula* was effective against *Meloidogyne hapla.* The population in the soil was reduced significantly in comparison to all other crops. Omidvar [3] tested the nematicidal effect of *Tagetes* sp. on the final population of *Heterodera rostochiensis* = (*Globodera rostochiensis*). Daulton and Curtis [4] indicated that *Tagetes erecta, T. patula,* and *T. minuta,* when grown in *Meloidogyne javanica* infested soil for 42-70 days in pots, reduced the nematode population to low level. Tayler and Murrant [5] concluded that population of *Longidorus elongatus* and other plant parasitic nematodes was much reduced after *raspberry* canes were incorporated into the soil. This reduction in number was due to a toxic substance in the plant material. Neem (*A. indica*) has been used by many workers for control of root-knot nematodes. Singh and Sitarmaiah [6], Hameed [7] Egunjobi and Afolami [8], tested leaf extract of neem on the population of *Pratylenchus brachyurus* on the growth and yield of maize. Kaliram and Gupta [9] tested the efficacy of neem leaves against *Meloidogyne javanica* infested chickpa (*Cicer arietinum* L.) Al-Obaedi *et. al.* [10] tested extracts of eleven plant species against *Meloidogyne javanica* on tomato. R.K. Jain and D.S. Bhatti [11] investigated the effect of different waiting periods for degradation of Neem leaves on the incidence of *Meloidogyne javanica* in tomato. Perwez *et. al.* [12] tested the effect of *Tagetes erecta* on *Meloidogyne javanica* infecting tomato. The present investigation was conducted to test the efficacy of extracts of three plants viz. Neem (*Azadirachta indica*), Sada bahar (*Vinca rosea*) Linn. and Jamal gota (*Jatropha curcas*) Linn. for control of anguinosis caused by wheat gall nematode *Anguina tritici.*

MATERIALS AND METHODS

Leaves of the test plant species were air dried, ground to a coarse powder and 300 g/litre of this powder was extracted three times with ethanol at room temperature. The filtrate was concentrated under vacuum to remove ethanol. The filtrate concentrated to dryness and it then redissolved in water for application in the field. The effect of leaf extracts was studied in the soil against *Anguina tritici.* A plot of land measuring 8 x 3 m at the Crop Diseases Research Institute, Pakistan Agricultural Research Centre, Karachi, was selected for this experiment. It was divided into 24 microplots each with an area of 1 m^2. Fifty cockles were inoculated in each subplot. The experiment was done in complete randomized block design. Each treatment consisted of six replicates. Treatment with leaf extract was given six days after inoculation. Ten percent

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Table 1.

S. No.	Name of plants	Average Weight of root (g)		Average Weight of shoot (g)		Average yield	Average No. of cockles/ plant	t-value
		Fresh	dry	Fresh	Dry			
1.	*Azadirachta indica*	5.96a	3.16	32.75	17.00	12.92	0	0.785 n.s
2.	*Vinca rosea* (Sada Bahar)	5.53a	2.53	27.25	15.00	11.00	0	
3.	*Jatropha curcas* (Jamal gota)	6.75b	2.53	27.95	16.50	11.39	10	
4.	Control	6.33b	2.53	27.45	16.50	11.37	13	

solution was prepared in water from the stock and 100 ml of it was poured in a row i.e. at a rate of 2 ml/plant. Fifty healthy wheat grains (cultivar Khyber 79) were sown in each microplot in the same row where the cockles were inoculated i.e. one cockle per healthy seed was innoculated.

RESULTS AND DISCUSSION

Azadirachta indica and *Vinca rosea* totally controlled *Anguina tritici* in soil because the number of cockles was zero in these two treatments whereas in the plants treated with *Jatropha curcas,* the number of cockles was 10/plant and in the control plot this number was 13/plant. The results analysed statistically by T-test show that there is no significant difference between *Jatropha curcas* and control in all parameters.

It was observed that the average fresh weight of root was not greater in the plants treated with *Azdirachta indica* but dry weight of root, fresh and dry weight of shoot was greater and average yield was also greater (Table 1). *Azadirachta indica* and *Vinca rosea* must have been toxic to *Anguina tritici* in the soil at larval stage since the number of cockles was zero in these two treatments. Many chemical compounds such as fatty acids (Tarjan and Cheo) [13]. Phenols (Hasan and Saxena) [14], alkoloids (Husain and Masood) [15] have been proved toxic to nematodes. In the present study, the mode of action of the compounds was not studied. However, it is believed that the mortality of *Anguina tritici* larvae in the soil with *Azadirachta indica* and *Vinca rosea* may be due to the presence of Kaempterol, quarcetin, myricetin, azadirachtin, and diacetylazadiractinol in *Azadirachta indica,* and Vinblastine, vincristine, Leurocristine and Leurosidine in *Vinca rosea.* These compounds have nematicidal value.

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