HOMOEO. DRUGS SHOW NEMATICIDAL PROPERTIES AGAINST TOMATO ROOT-KNOT NEMATODE IN VITRO

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ABSTRACT: Infective second stage juveniles of the tomato root-knot nematode *Meloidogyne incognita* were exposed to 5% simple dilutions of fifteen homoeopathic drugs along with a standard nematicide solution of 1% Furadan 3G and an associated check with 5% dilute alcohol; a non-chemical control was also maintained. Amongst the aforesaid eighteen treatments laid out in four replications, Arsenic was the deadliest, bringing about 100% mortality in just 36 hours, mortality percentages during the same period being 6, 26, 10, 12, 7, 11 and 5 in Sulphur, Thuja, Cocculus, Belladonna, Rhus tox, Antim. tart. and the standard check Furadan 3G respectively. Rate of mortality increased with increased time of exposure to Ipecac, Antim. tart., Cocculus, Belladonna, Coffea, Hyoscyamus, and Furadan 3G but decreased with increasing time of exposure to Sulphur and Rhus tox. up to sixty hours.

INTRODUCTION

Treatment of human nematode diseases through Homoeopathy is possibly as old as the science itself. But application of homoeopathic drugs against plant nematodes is a novel idea, born out of considerations that there being homoeo. drugs against animal parasitic nematodes, there could be some such which would be effective against phytoparasitic nematodes also, as basically all nematodes, whether human parasites or phytoparasites, belong to the same broad taxonomic group of Nematoda and their diversion to two different modes of existence, i.e. animal parasitism and phytoparasitism, which is indicative of the common trend for a better evolved existence, is not very distantly located in the geological time scale (Andrassy, 1976). But barring two preliminary reports—one by Sinhababu and Sukul (1984) and the other by Pradhan and Ray (1985) the authors are not aware of any work on the application of homoeopathic chemicals against plant nematodes. The present work, against one of the most serious plant parasites, *Meloidogyne incognita*, is part of an earnest endeavour towards that goal.

MATERIALS AND METHODS

Infective second stage juveniles of root-knot nematode *Meloidogyne incognita* (Kofoid & White, 1919; Chitwood, 1949) collected from cultures raised on tomato plants from a single egg-mass were exposed to eighteen treatments in four replications up to sixty hours. The treatments were (see Table) 5% dilutions in distilled water (v/v) of fifteen homoeopathic drugs, one

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TABLE

EFFECT OF DIRECT EXPOSURE OF SOME HOMOEOPATHIC DRUGS ON SECOND STAGE JUVENILES OF *Meloidogyne incognita*
(Average of 4 replications)

Treatments	Percentages of mortality after				
	12 hrs.	24 hrs.	36 hrs.	48 hrs.	60 hrs.
T1 Trillium	0	0	0	0	0
T2 Coffea	0	0	1	3	10
T3 Sulphur	0	1	6	20	30
T4 Hyoscyamus	0	0	0	1	8
T5 Ipecac.	0	0	0	0	25
T6 Cina	0	0	0	0	0
T7 Teucrium	0	0	0	0	5
T8 Senega	0	0	0	0	5
T9 Nux vom.	0	0	0	0	4
T10 Thuja occ.	2	8	26	38	50
T11 Arsenic.	12	60	100	100	100
T12 Cocculus	0	1	10	16	25
T13 Belladonna	1	2	12	32	50
T14 Rhus tox.	1	3	7	25	33
T15 Antim. tart.	0	4	11	20	50
T16 Alcohol (Dilute)	0	0	0	0	8
T17 Furadan 3G	0	1	5	15	50
T18 Control	0	0	0	0	0

associated check with 5% dilute alcohol in distilled water (v/v), one standard check with a conventional nematicide, Furadan 3G, in 1% solution (w/v) and a non-chemical distilled water control. A nematode suspension in distilled water was taken in a 4 oz., size bottle fitted with a two-way automatic plastic dropper which allows liquids to come out in drops at regular intervals through one outlet, the other outlet serving as the air inlet passage to fill up the vacuum due to the losing liquid. The suspension was thoroughly homogenized by repeated jerks, and nematode content per drop of this suspension was calibrated using a stereoscopic microscope. Thirty-eight drops of this suspension was taken in a previously cleaned cavity block to which two drops of mother tincture (ϕ) of a homoeo. drug, also kept in a vial with a similar two-way automatic dropper, was added, thus obtaining the desired 5% strength in the cavity block. In case of standard check, a 2% solution of Furadan 3G was prepared by shaking 2g of the chemical in 100 cc of distilled water; to 38 drops of nematode suspension, 38 drops of the aforesaid solution in the cavity block to 1%. In case of the associated check, 2 drops of 5% homoeopathic standard dilute alcohol and in case of non-chemical control 2 drops of distilled water was added to 38 drops of nematode suspension. Nematode mortalities were recorded under the stereoscopic microscope at

12, 24, 36, 48 and 60 hours after treatment and converted to percentages.

RESULTS AND DISCUSSION

The per cent mortalities at different time intervals are presented in the Table. Arsenic. (T11) was found to be deadly toxic to the nematodes, bringing about 100% mortality in just 36 hours, when mortality percentages during the same period in the standard check (T17) was only 5%, and in Sulphur, Thuja, Cocculus, Belladonna, Rhus tox. and Antim. tart. were 6, 26, 10, 12, 7 and 11 respectively.

After 48 hours of exposure, the mortality percentages further rose by 14, 12, 6, 20, 18, 9 and 10 in Sulphur, Thuja, Coeculus, Belladonna, Rhus tox., Antim. tart. and Furadan 3G and around 60 hours the percentage further rose by 10, 12, 9, 18, 9, 30 and 35 in the same drugs. Besides, in Ipecac. (T5) as against no mortality up to 48 hours, there was 25% mortality around 60 hours. It is seen that with the increasing time of exposure beyond 48 hours, the rate of mortality decreases with Sulphur and Rhus tox. and increases with Cocculus, Belladonna, Antim. tart., Coffea, Hyoscyamus, Ipecac, and Furadan 3G. Mortality percentages in the rest of the treatments ranged between 0 and 8 after 60 hours, which could possibly be due to the normal starvation process in an alcoholic medium.

How these drugs perform *in vivo* when introduced into the plant system forms another part of this study.

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REFERENCES

Andrassy, I.: *Evolution as the Basis for Systematication of Nematades*, 287. Pitman Publisher (1976).

Pradhan, A. K. and Ray, S.: Abstract, 4th All India Nematological Symposium, Udaipur (1985).

Sinhababu, S. P. and Sukul, C. N.: *Indian Phytopathology* (1984) 37, 3 : 188-191.