EVALUATION OF SOME MEDICINAL AND NATURAL PLANT EXTRACTS AGAINST TEAK SKELETONIZER, *EUTECTONA MACHAERALIS* WALK.

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Introduction

Natural plant products being indigenous resources with insecticidal repellent, antifeedant and growth inhibitor activities are one of the important alternatives to replace synthetic insecticides in the crop pest management programme (Prakash *et al.*, 1989 a). Steets (1975) applied 2.5-10% crude extract of *Azadirachta indica* and *Melia azadirach* against Mexican bean beetle inhibited 100% larvae mortality occurred. 5 and 10% aqueous solution of neem leaf extracts inhibited normal development of tobacco cut worms (Somnatsiri and Pathumchartpat, 1979). Ahmed *et al.* (1983) suggested the feasibility of botanical materials for pest control under traditional farming systems. 1 and 5% aqueous extracts of *Annona, Argemone, Calotropis* and *Ricinus* found to be the root forest products against brinjal grub, *H. vigintioctopunctata* (Murlikrishna *et al.*, 1990). Crude leaf extracts of *Andographis paniculata, Azadirachta indica* and *Cymbopogan citratus* showed significant protectant against *L. acuta* (Gupta *et al.*, 1990).

Teak (*Tectona grandis*) is one of the most extensively studied timber species for the damages caused by the insects. Teak skeletonizer *Eutectona machaeralis* causes loss in increment and deformity in the bole of the species. It was reported that a loss in timber of 4.5 m^3 per ha occurs in a year of severe epidemic. Beeson (1941) studied the biology, distribution and economic importance of this insect but as far as control measures are concerned studies and the literature is incomplete. Present study was thus undertaken by evaluating different plant extracts of 32 plant species against teak skeletonizer, *Eutectona machaeralis*. The results of this study are discussed in this paper.

Materials and Methods

Leaves of 32 different medicinal and natural plants were collected from NWFP nursery, Tropical Forest Research Institute, Jabalpur (Table 1). Larvae of *Eutectona machaeralis* were also collected from the foliage of teak and reared in lab by providing fresh leaves of teak as food to the larvae. Food supply was stopped a day prior to the starting of the experiment, so that the starved larvae could be available for releasing to feed on the treated leaves. To find out the efficacy of extracts, tender leaves of teak were collected from field and

Table 1

Effect of crude extracts (5%) against teak skeletonizer, Eutectona machaeralis

Treatments	Av. Leaf area consumed after 24 hrs.			Av. Larval mortality after 24 hrs.	
	(cm^2)	(%)	(Angle)	(%)	(Angle)
Abutilon indicum	1.28	13.33	19.03	13.33	13.70
Acorus calamus	1.60	16.66	21.62	13.33	13.70
Adhatoda vasica	7.86	33.12	27.84	20.00	20.93
Ailanthus excelsa	1.22	12.70	13.51	13.33	13.07
Aloe vera	0.50	5.20	8.41	26.66	26.15
Annona squamosa	0.80	4.16	7.38	26.66	26.15
Aristolachia indica	1.08	5.62	11.89	13.33	13.07
Artemisia maritina	1.64	8.53	14.03	13.33	13.07
Azadirachta indica	0.22	1.14	2.76	46.66	43.07
Bursera penicillata	1.54	8.02	10.62	00.00	00.00
Calotropis procera	0.00	0.00	00.00	60.00	53.77
Chrysanthemum indicum	1.54	8.00	13.25	6.66	6.85
Clerodendrum indicum	1.04	5.41	8.05	33.33	30.00
Datura metel	0.14	0.72	2.18	53.33	49.93
Eucalyptus hybrid	3.46	18.01	19.68	20.00	19.93
Ficus benghalensis	1.68	8.74	10.65	6.66	6.85
Jatropha curcas	3.50	18.22	24.80	13.33	13.07
J. gossypifolia	3.00	15.62	20.40	13.33	13.07
Lantana camara	1.30	2.27	5.39	13.33	13.70
Tagetes spp.	3.04	15.83	18.35	40.00	36.85
Melia azedarach	2.10	10.93	17.20	6.66	6.85
Nerium odorum	2.32	12.08	18.11	20.00	20.93
Ocimum sanctum	7.26	37.81	37.62	13.33	13.07
Operculina turethum	2.16	12.24	17.38	13.33	13.70
Parthenium hysterophores	2.52	13.12	16.20	13.33	13.70
Plumbago rosea	4.08	21.24	26.96	6.66	6.85
Pongamia pinnata	2.66	13.85	17.23	0.00	0.00
Ricinus communis	4.08	21.24	23.65	6.66	6.85
Polyathea longifolia	1.74	9,06	13.48	13.33	13.07
Tabernaemotana divaricata	1.76	9,16	11.39	20.00	19.93
Tribulus terrestris	3.58	18.64	20.27	13.33	13.70
Vitex negundo	2.98	15.51	18.27	6.66	6.85
Control (untreated)	10.88	39.07	48.81	0.00	0.00
SEM +		10.52		17.40	
CD at 5%		20.61		34.09	

then washed with tap water before cutting, into circles of about 5 cm diameter. The plant extracts in concentration of 5 per cent were prepared and sprayed uniformly on numbered circled cut leaves by a hand automizer @1 ml emulsion per circled leaf. Each sprayed circled leaf was then dried in air.

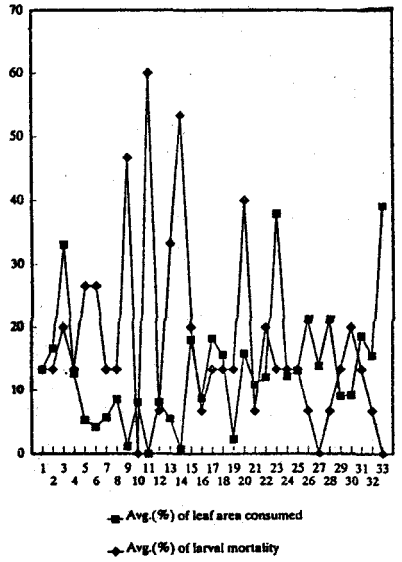
For studying the antifeedant property, a pair of starved third instar larvae of equal size were released on each circled sprayed leaf. The leaf was then covered by a petridish. After 24 hrs of releasing the larvae on treated leaf, the percentage of leaf area consumed by the larvae was calculated by using the leaf area meter (Systronics).

To study the insecticidal effect, five starved third instar larvae were released on the treated leaves in each replication. After 24 hrs of releasing the larvae on treated leaves, the per cent mortality was recorded. Both the trials, were conducted in five replications of each treatment, the control being maintained without treatment. The percentage of leaf area consumed and the larval mortality value were converted to angle value. The data was then analysed statistically for evaluating the efficacy of the extracts.

Results and Discussion

Antifeedant effect : The data based on the percentage of leaf area consumed showed that out of 33 treatments (Table 1 and Fig. 1), 5% fresh leaf crude extract of *Calotropis procera* proved to be most effective in minimising the consumption of leaf as compared to control. Data showed that the leaf consumed by larvae was almost nil as compared to 39.07 per cent in control. The treatments *Datura metel* and *Azadirachta indica* under which the leaf consumption were 0.72, 1.14 per cent. It is therefore, concluded that *C. procera, Datura metel* and *Azadirachta indica* are effective in the decreasing order to control the damage due to larvae of *E. machaeralis* on teak.

Fig. 1



Effect of crude extracts against teak skeletonizer *E. machaeralis*

Insecticidal effect : Insecticidal test records on the number of larvae killed in each treatment were noted after 24 hrs. and summarised in Table 1 and Fig. 1. The highest mortality of larvae was recorded under the influence of 5% fresh leaf crude extracts of *Calotropis procera* 60.00 per cent, *Datura metel,* 53.33 per cent as against nil mortality in control. *Azadirachta indica* and Marigold (*Tagetes* spp) were also effective as evidenced by 46.66 and 40.00 per cent mortality respectively. The per cent mortality of *E. machaeralis* larvae after 24 hrs of treatment including control range between 0 to 60 per cent. The least mortality (6.66 per cent) was recorded in

Chrysanthemum indicum, Ficus benghalensis, Melia azedarach, Plumbago rosea, Ricinus communis and *Vitex negundo. Pongamia pinnata* leaf extract proved totally ineffective.

Thus it can be concluded that the fresh leaf extracts of *Calotropis procera, Datura metel* and *Azadirachta indica* were found to be most effective against teak skeletonizer, *Eutectona machaeralis*. The results of the present investigations are of immense importance in the insect pest control, considering its harmless and pollution free implications on the environment further avoiding the operational and residual hazards that involve in the use of organic and inorganic insecticides. Field trials and studies are in progress to isolate the active compound responsible for the antifeedant and insecticidal effect against this pest.

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SUMMARY

Crude extract (5%) of fresh leaves of 32 different medicinal and natural plants were tested under laboratory against third instar larvae of teak skeletonizer, *Eutectona machaeralis* to evaluate their antifeedant and insecticidal effect. This investigation has revealed that the extracts of *Calotropis procera* followed by *Datura metel* and *Azadirachta indica* was found to be most effective and potent antifeedant against this pest.

सागौन पर्णकंकालक, *युटैक्टोना मेकेरेलिस* वाक० के विरूद्ध कतिपय औषधीय व प्राकृतिक निस्सारों का मूल्यांकन

पी०बी० मेश्राम

सारांश

32 विभिन्न औषधीय व प्राकृतिक पादपों की ताज़ा पत्तियों का कच्चा निस्सार (5%) सागौन पर्णकंकालक, *युटैकटोना मेकेरेलिस* के तृतीय रूप जातक के विरुद्ध पोषण विरोधी और कीटनाशी प्रभाव जानने के लिए प्रयोगशाला में परीक्षित किया गया। इस अन्वेषण से पता लगा कि इस नाशिकीट के विरूद्ध पोषण विरोधी के रूप में *कैलोट्रोपिस प्रोसेरा* का निस्सार, उसके बाद प्रभाव क्रम में *धतुरा धातु* और *अजेडिरेक्टा इंडिका* निस्सार प्रभावकारी रहे ।

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Snippets. PINE

North Carolina State Univ., in cooperation with southern pine producers and secondary users, has formed the Southern Pine Value Added Research Group. The mission of the group is to develop technical information that will accelerate the use of southern pine as a preferred species for mill-work, furniture, and cabinets. Project plans include defining quality needs of secondary users, surveying pine producers to determine their potential for entering the value added market, conducting drying research, and studying machining, fastening, and finishing of southern pine. The research program, directed by group members and housed at the Brandon P. Hodges Wood Products Laboratory at North Carolina State Univ., will be completed within the next 2 to 3 years. Primary and secondary manufacturers, equipment suppliers, trade associations, and grading agencies are encouraged to participate. For further information contact Joseph Denig, North Carolina State Univ., Box 8003, Raleigh, NC -27695-8003 (USA). Fax 919-515-7231.

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