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### Insecticidal activity of *Cleistanthus collinus* Roxb

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#### ABSTRACT

Fresh leaf juice, decoction and alcoholic extract of *Cleistanthus collinus* in different concentrations were studied for their insecticidal activity. Leaf decoction (50%) was found to be most effective, where single application was able to kill all the insects within 12 hr and control the insects till harvesting especially rice caseworm (*Nymphula depunctalis*) a common paddy pest of chhattisgarh region of India. Fresh leaf juice and alcoholic extract at 50% also prevented insect attack on rice crop but with some extent to adverse effect. This present study was carried out on the utilization of plants of local habitat for the benefit of tribal societies.

**Key words:** *Cleistanthus collinus*, insecticide, rice caseworm.

#### INTRODUCTION

*Cleistanthus collinus* (Euphorbiaceae) is a medium size tree, commonly known as karra or garari. *Cleistanthus collinus* (CC) is an extremely poisonous due to the presence of diphyllyne (lignan) lactone and its glycoside cleistanthin A and B [1-4]. The leaf, root and specially fruit act as a violent gastrointestinal irritant. Anticancer activity has been reported against epidermal carcinoma from the alcoholic extract of CC [5-7]. Water decoction of the leaves is used for suicidal purpose in many parts of Southern India [8-9]. Traditionally the farmers of Chhattisgarh used this plant leaves solution as an effective pesticide or insecticide, when insects attack on rice crop. Keeping this perspective in an attempt was made to find out insecticidal activity of leaf juice, leaf decoction and alcoholic extract of *Cleistanthus collinus*.

#### MATERIALS AND METHODS

##### Preparation of extract

*Cleistanthus collinus* leaves were collected from Guru Ghasidas Vishwavidyalaya campus, Bilaspur, India and authenticated by Professor T.R. Sahu, Department of Botany, Dr. H.S. Gour

University Sagar, India where a voucher specimen is preserved. Fresh leaf (2 kg) juice was extracted with tincture press to separate the juice. Decoction of fresh leaves (2 kg) was prepared with water and dried leaf powder (500 g) was soxhleted with 95% alcohol. Extracts were diluted with water in different concentration (10-100%) and sprayed on the infected rice crop by hand spraying method.

### **Infected rice crop treated with different concentrations of leaf extracts**

Two months old affected crops were selected for evaluating insecticidal activity of leaf extracts. To evaluate the effect on rice crop, the field was treated as below:

#### **Selection of Field**

- |             |  |
|-------------|--|
| Field I     | Control field no insecticide was used  |
| Field II    | Benzene hexachloride was used as standard drug   |
| Field III   | This field was subdivided into 3 segments and each segment was subdivided into 10 different parts. |
| Segment I   | It was treated with fresh leaf juice (10-100%)   |
| Segment II  | It was treated with leaf decoction (10-100%)   |
| Segment III | It was treated with alcoholic extract (10-100%)  |

After the treatment crops were observed till harvesting and observations are recorded in table 1.

## **RESULT AND DISCUSSION**

Data of Table 1 reveals that leaf extract of CC is an effective natural insecticidal agent. Field III was treated with different concentration of leaf juice, decoction and alcoholic extract and 50% concentration of all the extracts was found effective. The harvested rice grains were healthy and sound and rice yield was higher in crops treated with extracts as compared to control and standard treated.

Segment I treated with fresh leaf juice, 50% dilution of this juice was most effective and kill all the insects specially rice caseworm (*Nymphula depunctalis*). Slight brown stain was produced on the surface of leaves while growth of crop was normal.

Segment II was treated with leaf decoction, 50% dilution was found most effective and it produced effect within 12 hour and did not damage the crop and promoted its growth.

Segment III was treated with alcoholic extract and its 50% dilution was found moderately effective and developed brown stains on leaves. The growth of crop was affected adversely and even some plants died.

Findings of the present study indicated that leaf extract of *Cleistanthus collinus* effectively control the rice insect specially rice caseworm (*Nymphula depunctalis*). The rice crop is attacked by more than 10 diseases and about 18 insects and pest [10]. *Azadirachta indica*, *Chrysanthemum*, *Acorus calamus* and *Anthum* reported to have insecticidal activity. Rice is an important crop of chhattisgarh; it is attacked by banki, rice hispa, leaf roller and stem borer [11]. In the present study, 50% dilution of leaf juice and decoction effectively control these insects

within 12 hr after spray like pyrethrum [12]. Significant insecticidal activity of CC on paddy pest suggested exploring the active principles of this plant.

**Table 1. Effect of leaf extracts of *Cleistanthus collinus* on infected rice crop field**

Design of treatment	Extracts	Concentrations %	Observations	
Field I	Control			
Field II	Benzene hexachloride	50		
Field III	It was subdivided into 3 segment and each segment was again divided into 10 different parts	10	NA	
		20	NA	
		30	MA	
Segment I		Fresh leaf juice	40	MA
			50	More effective, slight brown stains, but healthy plants
			60	AA
			70	AA
			80	AA
			90	AA
			100	AA
		10	NA	
		20	NA	
		30	MA	
Segment II	Leaf decoction	40	MA	
		50	Most effective, plants were healthy, no brown stains on leaves	
		60	AA	
		70	AA	
		80	AA	
		90	AA	
		100	AA	
		10	NA	
		20	NA	
		30	MA	
Segment III	Alcoholic extract	40	MA	
		50	Moderately effective but plants showed brown stains	
		60	AA	
		70	AA	
		80	AA	
		90	AA	
		100	AA	

NA= Not affective, MA = Mild affective, AA = Adverse affect

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