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Short Communication

Potentials of *Euphorbia tricucalii* and *Ricinus communis* Products for the Control of *Callosobruchus maculatus*

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Abstract. This study examined the pesticidal effects of seed oil, seed kernel and wood ash extracts from *Euphorbia tricucalii* and *Ricinus communis* on cowpea weevil (*Callosobruchus maculatus*). All the extracts brought about significant reductions in the number of this pest, through contact killing, when compared to the control. The proportion of the pest killed was directly proportional to the concentrations of the extracts, though mortality at the varying extract concentrations was not significantly different from one another. Also, percentage mortality at corresponding extract concentrations from the two botanicals were not significantly different from one another in the three extract products. The trend of the effectiveness of the extracts from the two botanicals tends to suggest that extracts from *Ricinus communis* were more effective because of their instantaneous reactions on this pest.

Keywords: *Euphorbia tricucalii, Ricinus communis, Callosobruchus maculatus,* weevil control

Callosobruchus maculatus is the most damaging insect pest of cowpea in Nigeria (Kayode, 2006; Jackai and Adalle 1997). Kayode and Adanlawo (2002) had observed that a lot of factors hindered the control of this pest by chemicals in Nigeria.

The study being reported examined the potentials of the products obtained from *Euphorbia tricucalii* and *Ricinus communis* for the control of *Callosobruchus maculatus*. Both botanicals are members of the family Euphorbiaceae.

Preparation of *Euphorbia* and *Ricinus* oil extracts. Seeds of ripe fruits of *Euphorbia* and *Ricinus* were grounded to fine paste. The pastes of each were poured into clean muslin cloths and the oil was pressed out. 1%, 2%, 3%, 4% and 5% *Euphorbia* oil (EO) and *Ricinus* oil (RO) extracts were prepared by mixing 10, 20, 30, 40 and 50 ml each of the EO and RO with 990, 980, 970, 960 and 950 ml of distilled water respectively with an emulsifier (1% soap solution).

Preparation of *Euphorbia* and *Ricinus* seed kernel extracts. 10, 20 30, 40 and 50 g each of *Euphorbia* and *Ricinus* seed pastes were soaked in 1litre of distilled water for 12 h and later filtered through a clean muslin cloth and the filtrates used for the experiments.

Preparation of *Euphorbia* and *Ricinus* wood ash extracts. 10, 20, 30, 40 and 50 g of wood ash from *Euphorbia* and *Ricinus* were soaked in 1litre of distilled water for 12 h and later filtered through a clean muslin cloth and the filtrates used for the experiments.

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Test of the *Euhorbia* and *Ricinus* oil, seed kernel and wood ash extracts. For each of the botanicals, 75 petri dishes were double-lined with Whatman No.1 filter papers. They were then divided into three equal groups. One group was used to test the effects of the oil extracts, another for the seed kernel extracts and the third for the wood ash extracts.

In each group, the 1%, 2%, 3%, 4% and 5% extracts were used to moisten the filter papers. Each treatment had five replicates assays. The papers were allowed to dry for 10 min after which 5 weevils were introduced to them. Control experiments with filter papers moistened with distilled water were set up and replicated five times. The percentage mortality of the weevils at 24, 48 and 72 hrs were observed and determined as:

$$\% \text{ Mortality} = \frac{\text{number of dead weevils}}{\text{total number of weevil treated}} \times 100$$

The three products from the two botanicals examined in this study brought about significant reductions in the number of *C. maculatus* at all the extract concentrations. The reductions were obtained through contact killing. The seed oil extracts from both botanicals appeared to be highly effective even at lower concentrations, where over 80% of the weevil treated were eliminated within 72 h of the treatments in both 1% and 2% extract concentrations (Table 1). The extracts from *Ricinus communis* appeared to have instantaneous mortality effects on the weevil. Table 1, revealed that the % mortality obtained from the extracts of this botanical varied from 46% in 1% extract concentration to 84% in 5% extract concentration within 24 h of application. In both botanicals, the % mortality

was observed to be directly proportional to the concentrations of the extracts. There were however, no significant differences (p =0.05) in the effectiveness of both botanicals at all the extract concentrations.

The results obtained from the treatments with extracts from the seed kernel of both botanicals (Table 2) were similar to those of the seed oils. The effectiveness of the seed kernels extracts from the two botanicals were not significantly different at 5% level of significant (t-test) and the % mortality attained were comparable at all the extracts concentrations. Table 3 shows the results obtained after treatments with wood ash extracts from the two botanicals. In the wood ash extracts derived from *Euphorbia tricucalii*, the % mortality increased with increase in the experimental time. The wood ash extracts derived from *Ricinus communis* appeared to have instantaneous mortality effects on the weevil as considerable proportions of the weevils were eliminated within 24 hrs of treatment. The % mortality ranged from 44% in 1% extract concentration to 80% in 5% extract concentration (Table 3).

Table 1. Percentage mortality of *Callosorbruchus maculatus* treated with seed oil extracts from *Euphorbia tricucalii* and *Ricinus communis*

Extract concentration (%)	Mortality (%) after treatment for*						Cumulative mortality (%)	
	24 h		48 h		72 h			
	E.t	*R.c*	*E.t*	*R.c*	*E.t*	*R.c*	*E.t*	*R.c*
1	32	46	30	28	24	20	86	94
2	36	56	28	24	24	16	87	96
3	40	68	32	20	28	12	100	100
4	42	72	30	16	28	12	100	100
5	48	84	28	12	24	4	100	100
Control	0		0		4		4	

* = % is based on the total number of *C. maculatus* per treatment; *E.t = Euphorbia tricucalii, R.c= Ricinus communis,* LSD = 2.146

Table 2. Percentage mortality of *Callosorbruchus maculatus* treated with seed kernel extracts from *Euphorbia tricucalii* and *Ricinus communis*

Extract concentration (%)	Mortality (%) after treatment for*						Cumulative mortality (%)	
	24 h		48 h		72 h			
	E.t	*R c*	*E.t*	*R.c*	*E.t*	*R.c*	*E.t*	*R.c*
1	44	42	40	34	8	24	92	100
2	48	44	36	36	12	20	96	100
3	52	48	36	34	12	18	100	100
4	56	50	28	36	16	14	100	100
5	60	54	24	34	16	12	100	100
Control	0		0		4		4	

* = % is based on the total number of *C. maculatus* per treatment; *E.t = Euphorbia tricucalii, R.c= Ricinus communis,* LSD = 2.158

Table 3. Percentage mortality of *Callosorbruchus maculatus* treated with wood ash extracts from *Euphorbia tricucalii* and *Ricinus communis*

Extract concentration (%)	Mortality (%) after treatment for*						Cumulative mortality (%)	
	24 h		48 h		72 h			
	E.t	*R.c*	*E.t*	*R.c*	*E.t*	*R.c*	*E.t*	*R.c*
1	12	44	24	28	44	16	80	88
2	16	52	28	24	40	12	84	88
3	18	64	32	20	34	12	84	96
4	24	72	28	20	32	8	92	100
5	28	80	32	16	36	4	96	100
Control	0		0		4		4	

* = % is based on the total number of *C. maculatus* per treatment; *E.t = Euphorbia tricucalii, R.c= Ricinus communis,* LSD = 2.623

A comparison of the efficacies of the three products at corresponding extract concentrations revealed that they were not significantly different from one another (p =0.05). The trend in the efficacy, however tends to suggest that *Ricinus communis* appeared to perform better in the control of this pest.

The above results revealed that complete control of *C. maculatus* could be attained with the use of these botanical products. The results from this study were comparable to those earlier obtained from seed oil, seed kernel and wood ash extracts from *Gmelina arborea* by Kayode and Ayeni (2003).

Previous investigations on the botanicals had revealed that the active ingredients in *Euphorbia tricucalii* include euphorbol and cycloartenol (Oliver, 1960), while those of *Ricinus communis* include ricine, ricinolein and ricin (Gill, 1992). These limonoids might be said to have contact killing effects on *C. maculatus*.

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