

**CINNAMON, *CINNAMOMUM MERCADOI* VID., A
POTENTIAL FUMIGANT FOR THE BEAN WEEVIL,
CALLOSOBRUCHUS CHINENSIS (L.)¹**

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¹Portion of the masteral thesis of the first author.

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The increasing array of problems and hazards associated with the indiscriminate use of synthetic petroleum-based chemicals to control insect infestations has spurred the renewed interest in botanical pesticides. In the Philippines, Morallo-Rejesus (Philipp. Ent. 7(1): 1-30, 1987) reported the most recent and comprehensive information on botanical materials against various pests. These botanical materials were claimed by various workers to possess at least one of the following pesticidal actions: fungicidal, nematocidal, bactericidal and insecticidal.

In 1989-1990, the authors explored the potential of several plant materials for their insecticidal activity against the bean weevil. During these series of tests, the fumigating property of the volatile oil extracted from the leaves of cinnamon, an endemic species, was accidentally discovered. No record has ever been documented yet anywhere, to the best knowledge of the authors, regarding the fumigant action of cinnamon.

It was observed during the preliminary tests (bracketing) that when cinnamon oil was impregnated in filter papers it caused a knockdown of weevils two hours after release. In all occasions the insects died even when they were not in direct contact with the oil. This observation roused the suspicion that the oil may have acted as a respiratory poison against the bean weevil.

A simple experimental set-up was then devised to test the possible fuminating effect of the oil (Figure 1). Five volumes (9, 18, 27, and 36 and 45 microliters equivalent to 10, 20, 30, 40 and 50 mg, respectively) were separately placed in glass vials. Control treatment which consisted of vials without oil was provided. Five pairs of three-day old weevils were introduced in a 40 cm³ test tube representing one replication and covered with nylon tulle screen; a rubber band was used to fasten the cover firmly. Then the vials containing the oils were attached to the inverted test tubes containing the insects by means of a masking tape. Three replications were provided for each treatment. Insect behavior and mortality were recorded 1.5 hours after insect exposure to the oil. Two trials were conducted. Data were analyzed using ANOVA in simple CRD.

The insects started to fall from the sides of the test tubes two hours after exposure. Upon falling, rapid wing flapping was accompanied by violent leg

tremors and antennal twitching. Majority of the test insects appeared at a moribund state after three hours and failed to regain normal activity.

Table 1 clearly shows that cinnamon oil exhibited strong fumigating action. The volatile oil acted as a potent respiratory poison which caused 57% to 100% mortality of adult weevils in 24 hours.

To this date no follow-up studies have been conducted to establish the viability and usefulness of cinnamon oil to control adult bean weevils in a larger scale. What makes cinnamon oil more interesting is that it can be used in small quantities, is fast acting and leaves no off flavor on the protected seeds even in sealed containers. The only obvious constraint is that potential small scale users may have to purchase the pure oil. In as much as the apparent active component(s) is in the volatile oil from the leaves, the problem can be possibly remedied by using freshly harvested and chopped cinnamon leaves which can then be incorporated with the seeds and stored hermetically. Although it has never been studied extensively before by the authors, the simple procedure may provide sufficient control to both F1 and F2 generations.

These preliminary results offer an additional information to the existing Philippine list of plant materials which are promising pest control agents. Moreover, they may serve as basis for future research activities on botanical pest control.

Received 17 December 1992

Table 1. Mortality (after 24 hours) of adult weevils treated with the volatilized oil of cinnamon.

CONCENTRATION ul/40 cm ³ (wt. in mg.)	MORTALITY (%) ¹
9 (10)	57b
18 (20)	80a
27 (30)	90a
36 (40)	87a
45 (50)	100a
Control (no oil)	0c
C.V. (%)	16.41
Significance	**

¹Means of two trials with three replications each; means followed by the same letter are not significantly different using DMRT (5%), ** - highly significantly at 1% level.

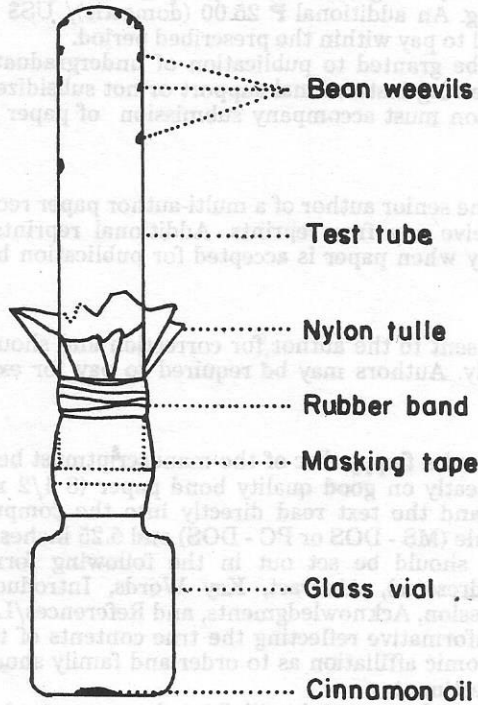


Figure 1. Diagram of the sample set up for testing the fumigating action of cinnamon oil against the bean weevil.