



**UNIVERSITI PUTRA MALAYSIA**

***THE EFFECTS OF BURNT COCKLE SHELL AS GRACEFUL AWLSNAIL  
REPELLENT ON GREEN MUSTARD (*Brassica rapa*)***

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**FP 2013 40**

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SERDANG, SELANGOR DARUL EHSAN

2012/2013

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BY

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160081

A project report submitted to Faculty of Agriculture, Universiti Putra Malaysia, in fulfilment of the requirement of PRT499 (Final Year Project) for the award of the degree of Bachelor of Agricultural Science.

Faculty of Agriculture

Universiti Putra Malaysia

2012/2013

**CERTIFICATION**

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## ACKNOWLEDGEMENT

First and foremost, all praise to Allah (GOD) for the blessing, guidance and for giving a good health, physical and mental strength to complete this project and Alhamdulillah finally I successfully completed my final year project.

Foremost, I would like to express my sincere gratitude to my supervisor, Dr.NoridaMazlan for the continuous support of my Undergraduate study and research, for her patience, motivation, enthusiasm, and immense knowledge. Her guidance helped me in all the time of research and writing of this thesis. I could not have imagined having a better supervisor and mentor for my Undergraduate study.

Beside my supervisor, I would like to thanks to the staff at Crop Protection, EncikTamsil bin Sharif and En.Hisham who guidance help me in giving some ideas and motivation. Not least to my beloved parents Nordin Bin Aman and SamsiahBintiMohdYunus for understanding, financial support and becoming my biggest inspiration to finish this project.

My sincere thanks also go to all my best friends who are willing to lend me their time and helping me whenever needed. Without their kindness, I wouldn't finish my Final Year Project in time. Here, I would like to take opportunity to give credit to all involved either directly or indirectly during running of this project. Thanks for helping me in all sort of ways possible in making final year project a reality.

Thank you.

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## ABSTRACT

Green mustard, *Brassica rapa* L. locally known by the generic name 'sawi' is the most popular leaf vegetable in Malaysia. Several cultivars differentiated by their stem colour, leaf size and flowering habits are grown locally. Problems of sawi cultivation are insect, disease and snails. One of the important snails that attack *B. rapa* is Graceful Awlsnail (*Allopeas gracile*). The snail attacks during seedling stages and 1-2 weeks after the green mustard was planted. Application of synthetic molluscicide such as metaldehyde and methiodicarb is an effective ways for controlling snail; however, it can contribute to detrimental effects to environment and biodiversity. Therefore, alternative methods in controlling the snail using natural repellents could help to reduce the negative impact of synthetic molluscicides. Repellents such as neem, tea and coffee have been reported to be effective in controlling snail. However, another cheap repellent, cockle shell has shown to be a promising repellent, although it has not been scientifically reported. The objective of this experiment is to determine the effectiveness of cockle shells as repellent for controlling *A.gracile*. This experiment was conducted in glasshouse in Field 2 Universiti Putra Malaysia for rearing the snail and Laboratory C, Block E, University Putra Malaysia for repellent study; five treatments of Cockle shell with 5 replications were used. Each replicates consisted of 25 snails. The experiment was arranged in randomized complete block design. Parameter taken was the time for the snail to move away from the burnt cockle shell to the furthest distance in petri dish. The result shown burnt cockle shell is successfully repelled the snail and the amount of cockle shells powder needed is correlated to the stages of the snails with younger stage snails repelled faster compared to later stages snail.

## ABSTRAK

Sawi hijau, atau nama saintifiknya adalah *Brassica Rapa L* adalah sayuran hijau berdaun yang popular di Malaysia. Masalah penanaman sawi adalah serangga, penyakit dan siput. Salah satu siput penting menyerang *B. Rapa* adalah siput panjang kecil (*Allopeas gracile*). Serangan siput banyak semasa peringkat anak benih dan 1-2 minggu selepas sawi hijau ditanam. Penggunaan racun siput sintetik seperti metaldehyde dan methiodicarb adalah cara yang berkesan untuk mengawal siput, tetapi menyumbang kepada kesan buruk kepada alam sekitar dan biodiversiti. Oleh itu, kaedah alternatif dalam mengawal siput dengan menggunakan penghalau semulajadi boleh membantu untuk mengurangkan kesan negatif daripada racun siput sintetik. Penghalau seperti bambu, teh dan kopi telah dilaporkan berkesan dalam mengawal siput. Walau bagaimanapun, satu lagi kaedah murah yang menggunakan penghalau semulajadi, kulit kerang bakar telah menunjukkan kesan positif untuk menjadi penghalau semulajadi, walaupun ia tidak pernah dilaporkan secara saintifik. Objektif eksperimen ini adalah untuk menentukan keberkesanan kulit kerang bakar sebagai penghalau untuk mengawal *A. gracile*. Eksperimen dijalankan di rumah kaca di Ladang 2 Universiti Putra Malaysia untuk pemeliharaan siput dan Makmal C, Blok E, Universiti Putra Malaysia untuk kajian penghalau. 5 rawatan kulit kerang bakar dengan 5 replikasi telah digunakan. Setiap replikasi terdiri daripada 25 siput. Eksperimen disusun dalam reka bentuk blok lengkap secara rawak (RCBD). Parameter yang diambil ialah masa untuk siput untuk bergerak dari serbuk kulit kerang bakar dengan jarak siput dalam piring petri. Keputusan eksperimen menunjukkan serbuk kulit kerang bakar dapat menghalau siput dan hanya jumlah kuantiti yang sedikit diperlukan untuk menghalau siput bersaiz kecil.

## CHAPTER 1

### 1.0 INTRODUCTION

Snails are common pests in Malaysian agriculture sectors especially in vegetables, herbaceous plant, seedling and fruit ripening close to the ground like strawberries and tomatoes. All types of snails are classified as mollusc and categories in the phylum Mollusca because they have hard shell that protects their bodies. Most of molluscs have no stereotyped pattern, as in a segmented worm or a jointed arthropod and they also have no skeleton. They are unique animals because they can adapt to a variety of living conditions and doesn't require large amount of food. Most of them are slow moving and confined to rather special habitats. They also bear the adaptive stamp of environment in a far more obvious way than more active animals that can move about widely. They are get their food directly from foliage and fruits. They are destructive agricultural pests causing economic damage to a wide variety of plants including horticulture, field crops, and forestry.

Damage caused by snails depends not only on their activity and population density, but also on their feeding habits, which differ from one species to another. The damage causes considerable financial loss on crops such as cereal, vegetables, as well as other agricultural and field crops. The land snails feed on leaves, roots, tubers and ornamental plants (Bishara et al., 1968; El-Okda, 1981). In addition, during its movement it causes an undesirable smell which prevents men and even animals from feeding on these contaminated plants (El-Okda, 1984; Kassab&Daoud, 1964). Crops contaminated by snail slime lose their marketability and their export potential in many countries (Baker & Hawke, 1990; Ittah&Zisman, 1992).

One of the most serious snails that attack vegetables is *Allopeasgracile* known as Graceful Awlsnail. The present of this pest in organic farm, vegetable farm and also glasshouses can result in low yield production and slow growth of the vegetables. The Graceful Awlsnail caused insignificant damage to young leaves, seedlings and it will make the vegetables growth abnormalities and become stunted or it's also can cause death. Consequently, different types of chemical utilization are used to overcome the problem. It is difficult to effectively control this species with metaldehyde baits in humid environments. According to Martin, 1991; Kelly & Martin, 1989, there are many agricultural situations where poison baits are not desirable, because of danger to non-target organism like birds and dogs, difficulty in placing baits where snails are feeding, or low attractiveness of baits to target pests.

One possible means of coping with this problem is to use material such as natural products that acts as a repellent as well as a control agent for this pest. Repellent means to drive back, the movement away being repulsion. There are some of repellent for repel the snail at the garden or farm like tea, coffee, neem, peppermint and others. However, it also found burnt cockle shell powder can repel snails and practice in organic farms at Bangi (Norida, 2012). Therefore the objectives of this study are:

1. To study the potential of burnt cockle shells powder as snail repellent.
2. To determine the effective application rate of burnt cockle shells powder in repelling the snail.

Source	Sum of	DF	Squares	Mean Square	F Value	Pr> F
Model		8	1827.222168	228.402771	21.03	<.0001
Error		16	173.782656	10.861416		
Corrected Total		24	2001.004824			

  

R-Square	CoeffVar	Root MSE	time Mean
0.913152	22.21518	3.295666	14.83520

Source	DF	Anova SS	Mean Square	F Value	Pr> F
trt4	1323.621664	330.905416	30.47	<.0001	
stage 0	0.000000	.	.	.	
rep 4	503.600504	125.900126	11.59	0.0001	
trt*stage	0	0.000000	.	.	

Duncan Grouping			Mean	N	trt
		A	28.858	5	con
B	13.962	5	t1		
		B			
		C	12.602	5	t2
		C			
		C	10.550	5	t3
		C			
		C	8.204	5	t4
		C			

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