

**THESIS TITLE : STUDIES ON LIFE HISTORY, SPATIAL DISTRIBUTION AND
SEQUENTIAL SAMPLING PLAN OF BEAN POD BORER,
Maruca testulalis (GEYER) LEPIDOPTERA : PYRALIDAE ON
COWPEA.**

AUTHOR : MISS PAYOAW PHOMPANJAI

THESIS ADVISORY COMMITTEE :

Tasanee Jamjanya Chairman

(Assistant Professor Dr. Tasanee Jamjanya)

Wirote Khlibsuwan Member

(Assistant Professor Dr. Wirote Khlibsuwan)

Sanit Luadthong Member

(Associate Professor Dr. Sanit Luadthong)

ABSTRACT

Pod borer, *Maruca testulalis* (Geyer) is a major insect pest of cowpea particularly during reproductive stage. Details of its life cycle, damaging, behavior, dispersion pattern, economic threshold and an effective sampling method is important for the pest control. Study of life cycle showed that the optimum ratio between male and female moths was 1:1 of 5 couples. The highest number of eggs (49.6 eggs/female) was obtained at this rate (pairs) whereas 10 couples gave the lowest. The study also indicated that the moths laid more eggs in October, 1995 (temp. 25.9°C., 78.2% R.H.) than in April, 1996 (temp. 28.5°C., 74.3% R.H.). Egg of white or pale yellow is normally laid in a group of two and lasted 2-3 days with five instars while pupal stage and adult longevity were 7-8 days, respectively. Its life cycle lasted 24-32 days. Ratio of male and female adult was found to be at 1:1.1. From the study of pod borer distribution, we found 3 patterns of distribution i.e. regular (described by binomial), random (described by poisson) and clump (described by negative binomial). The damage caused by this insect was increased in mature plants which the distribution as negative binomial at 99% probability index of aggregation (k) =

2.51 and measure of aggregation (b) = 1.17. Pod borer is widespread in dry season more than late rainy season. It was found to widespread on cowpea at about 50-60 days old causing a serious loss on flowering (F_5 stage) and on pod at P_3 stage (pod diameter > 0.6 cm.) is 31.4% and 35.6%, respectively. Synthetic pyrethroid insecticide should be sprayed 1 time at 50% pod filling or twice at 50% bloom and 50% pod filling or otherwise when 10% or 20% damage on flower and pod is observed. This method gave the highest yield and benefit. In conclusion, the economic threshold for *Maruca* infestation of cowpea grown during late rainy season and dry season would be 20% and 10% of damage flower and pod, respectively.

Further study was then conducted, table for sequential sampling. The hypothesis of this study based on Sequential Probability Ratio Test (SPRT). The value of error type I (α) = 0.05 and error type II (β) = 0.1. Two parallel regression lines were obtained and the area between the lines can be divided into 3 parts. At 10% economic threshold spraying should be done when percentage of cumulative loss (H) $\geq 6.99 + 15.79n$ and the spraying is not necessary when $H \leq 6.99n - 12.30$ (n = number of groups of 5 cowpea plants). The sampling is to be continued when H value is in between the two regression lines. At 20% economic threshold spraying should be performed when $H \geq 5.56n + 27.29$ and not be performed when $H \leq 5.56n - 21.25$. Continued sampling will be done only when H value is in between the two regression lines. The sequential sampling plan can limit time use for sampling by 87% and number of sample by 17 - fold when compares with fixed sample size sampling, conduct to limit labour and cost.