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Short communication

Incidence of pepper weevil (*Lophobaris piperis* Mrshl.) larvae in Kluang, Johor

[Kejadian larva kumbang belalai lada (*Lophobaris piperis* Mrshl.) di Kluang, Johor]

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Key words: pepper weevil, *Lophobaris piperis,* incidence, rainfall

Abstrak

Hasil daripada kajian selama 3 tahun untuk mengawas kejadian larva kumbang belalai lada (*Lophobaris piperis* Mrshl.) di ladang menunjukkan bahawa hujan tiada kaitan yang nyata dengan aras populasi larva kumbang. Kesimpulan ini berasaskan nilai korelasi (r = 0.297) yang rendah dan tidak nyata (p <0.05) antara bilangan purata larva setiap pokok dengan parameter hujan, iaitu jumlah hujan bulanan (r = 0.004), kadar kekerapan hujan bulanan (r = –0.021) dan jumlah purata air hujan setiap hari hujan (r = 0.118).

Abstract

The result of a 3-year survey to monitor the incidence of the pepper weevil (*Lophobaris piperis* Mrshl.) larvae in the field indicated that rainfall had no significant association with larval population level. This was shown by the low and non-significant (p <0.05) correlation value (r = 0.297) between mean larva count per vine against rainfall parameters, namely total monthly rainfall (r = 0.004), monthly rainfall frequency (r = –0.021) and mean rainfall volume per rainy day (r = 0.118).

Introduction

The pepper weevil (PW), *Lophobaris piperis* Mrshl., is an important pest of pepper in Johor. The larvae bore into the fruit-bearing lateral branches of the pepper vine causing them to die or snap at the bored nodes. The larvae also bore into the climbing stem of the vine resulting in poor vine growth, due to the accumulated damage over time. In many cases, weevil damage also predisposes the vine to attacks by pathogenic fungi, such as *Fusarium* sp. (Mohd. Anuar and Loh 1991). Larval damage has also been implicated in the slow-decline disease of pepper in Johor (Mohd. Anuar and Loh 1991). Adult weevils feed on the pepper berries, but their damage is economically less important.

General observation on pepper vines in Kluang seemed to indicate that pepper weevil attacks are less serious during the rainy season, becoming more serious during the drier period. This observation was based on the random field inspections of pepper vines for PW larvae and their damage. However, the validity of this observation has never been empirically verified.

There are limited information on how Malaysian weather affects the abundance of local insect pests. Earlier reports suggested that wind, rainfall and humidity may have some influence on insect biology in this

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country (Gater 1925; Corbett and Dover 1928; Lever 1953). Their opinions were based mainly on observations of the seasonal variations of population of the coconut zygaenid moth, *Brachartona (Artona) catoxantha* Hamps. More recently, Muney and Tan (1986) as well as Azhar (1986) discussed the effect of rainfall on the population dynamics of other local insect pests, namely the oriental fruit fly (*Dacus dorsalis* Hend.) in Penang and the cocoa mirid (*Helopeltis theobrome* Mill.) on cocoa respectively.

The objective of this study was to verify the observations on the influence of rainfall on PW larval population and to quantify this relationship, with the hope that the information gathered can be used as a basis to predict future PW outbreaks in the field.

Materials and methods

The study was carried out over a 3-year period (1983–1986) in MARDI Research Station in Kluang, Johor. The weather in Kluang is relatively wet for most of the year, recording an average of 2 122.1 mm yearly rainfall for the last 15 years. However, chances of dry periods are quite high during January-March and, to a lesser extent, from June to August (Nieuwolt 1982). The study site was a pepper plot (0.76 ha) consisting of approximately 1 200 4-year-old vines. This plot has not been sprayed with any insecticides for at least 2 years prior to the experiment, and therefore has an undisturbed natural weevil population.

Prior to sampling, the pepper vines in the plot were numbered for easy identification. Twenty-five vines were randomly selected from the whole field for each sampling exercise using random number table. Fresh choices were made if the selection fell on dead or missing vines. Samplings were carried out at monthly intervals, usually at the end of every month. The vines were inspected for larval damage, and all infested twigs were collected, pooled and brought back to the laboratory. The twigs were cut open to determine the presence of PW larvae. The PW adult population in the field was not determined due to sampling difficulties.

Data on the number of PW larvae collected per sampling, number of rainy days and the amount of rain between sampling periods were recorded. The rainfall data were taken at a weather station located in MARDI, Kluang. The relationship between larval number and the parameters taken was determined using multiple linear regression technique on an in-house software program designed for such a purpose.

Results and discussion

Figure 1 showed the fluctuations of PW larval population in relation to monthly rainfall during the study period. PW larvae were present in the field throughout the year. Larval population level ranged widely, from a low of 0.16 larva/vine in April 1983 to a high of 9.2 larvae/vine in February 1984. Mean larval count for the duration of the study was 3.14 ± 1.98 larvae/vine. There was no definitive pattern of peaks and trough of the larval population which varied from year to year *(Figure 1)*. Rainfall pattern was similarly very irregular. In 1983, monthly rainfall was highest in September (282.24 mm), shifting to December (362.2 mm) in 1984, September (263.1 mm) in 1985 and March (524.3 mm) in 1986 *(Figure 1)*. In between were minor rainfall peaks, i.e. wet months when monthly rainfall was in excess of 200 mm, such as in May 1984 and August to October in 1985. The months of March and April 1983 were the driest when only 35.52 mm and 33.1 mm of rainfall were recorded respectively.

Although the larval population and rainfall fluctuated from month to month, larval abundance was not significantly associated ($p < 0.05$) with rainfall. This was shown by the non-significant correlation value ($r = 0.297$) between the mean number of larvae per vine with the rainfall

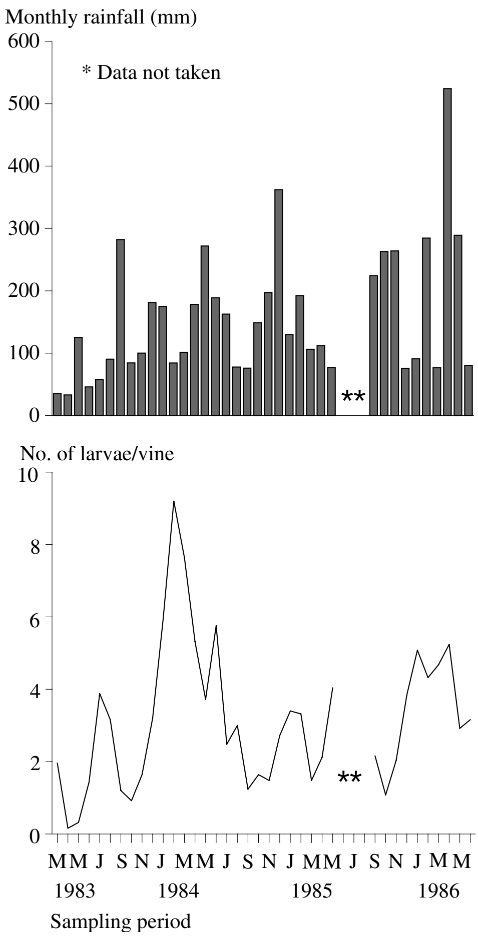

*Figure 1. Population fluctuation of pepper, weevil, **Lophobaris piperis** larvae in relation to monthly rainfall during the sampling period*

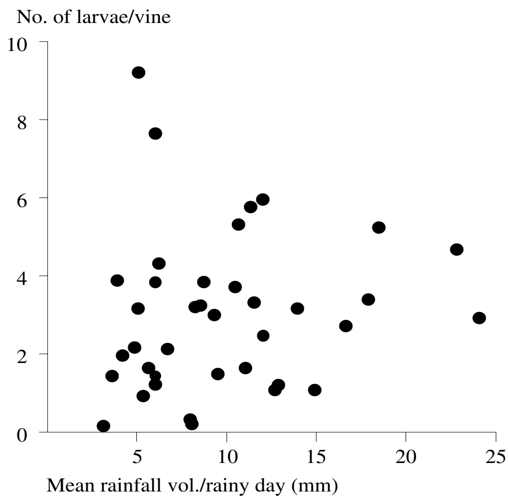

*Figure 2. Scatter plot of number of pepper weevil, **Lophobaris piperis** larvae against mean rainfall volume per rainy day during the sampling period*

parameters, and by the low correlations between total rainfall ($r = 0.004$), number of rainy days within the month ($r = –0.021$), and mean total rainfall per rainy day ($r = 0.118$) with the mean number of larvae per vine.

A scatter plot of the mean number of larvae per vine against the mean rainfall volume per rainy day did not show any definitive relationship between the variables. This confirmed that the rainfall volume had no impact on larval population *(Figure 2)*. Most of the larval population scatter points tend to clump together, around the 5–15 mm rainfall range, as this was the normal daily rainfall range for Kluang and the range within which most of the data were collected. Mean total rainfall per rainy day during the sampling period was 10.31 ± 5.4 mm.

Pepper weevils lay their eggs inside pepper nodes, hence were presumably well-protected from the direct effect of rainfall. Our observations on the pepper growth pattern in MARDI showed that production of new leaf flushes and lateral branches is most active during periods of sustained rainfall, such as during the monsoon season. Similar observation on pepper leaf flushing pattern has also been observed in India (Kumar and Nair 1985). Thus, more oviposition sites were available during this period, and should correspondingly lead to increased larval population in the following months. However, this was not shown in the study. While there were monthly variations in larval numbers in the field, they were not associated, either positively or negatively, with the rainfall pattern. The erroneous observations made earlier could have been due to the more pronounced wilt symptoms on damaged vines during a drought, which tend to make weevil damage more conspicuous. Conversely, the effect of weevil damage could have been masked by the vigorous growth of the vines during the rainy season, even though weevil damage levels may remain unchanged.

In conclusion, the PW incidence in pepper farms in Kluang appeared to occur randomly throughout the year. While there was variation in the larval population, it was not significantly associated with rainfall. As a result, monitoring of rainfall, as a basis to predict weevil incidence and potential outbreaks in the field, is not useful for weevil management. Proper management must, therefore, continue to rely on periodical monitoring of the pepper vine for weevil damage, in order to initiate timely control actions.

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