Jurnal Perlindungan Tanaman Indonesia, Vol. 21, No. 2, 2017: 135–138
DOI: 10.22146/jpti.24235

Short Note

Confirmation on Status of *Omotemnus miniatocrinitus* Chevrolat (Coleoptera: Dryophthoridae) in Snakefruit Growing Areas

Konfirmasi Status Omotemnus miniatocrinitus *Chevrolat (Coleoptera: Dryophthoridae) pada Areal Pertanaman Salak*

Rangga Arinta Wisastra[1)]*, Edhi Martono[2)], & Suputa[2)]

[1)]*Tanjung Balai Asahan Agricultural Quarantine, Jln. Perintis Kemerdekaan KM. 9 Simpang Empat Asahan, North Sumatera 21271*

[2)]*Department of Crop Protection, Faculty of Agriculture, Universitas Gadjah Mada Jln. Flora 1, Bulaksumur, Sleman, Yogyakarta 55281*

**Corresponding author. E-mail: ranggaarinta@gmail.com*

Submitted April 20, 2017; accepted May 19, 2017

The insect has an important role in agricultural sector, but mostly as pests. However, not all insect species in agroecosystem was considered harmful; some of them were natural enemies such as predator and parasitoids, and also pollinator and saprophagous insects (Untung, 2006). The latter was the most beneficial insects to help in recycle organic material, as they feed on rotten or died plants, animal cadaver, feces, fallen leaves, died trunk and etc. (Borror, *et al.*, 1992). Ground surface beetle which belongs to the ordo of Coleoptera possesed these traits and play on important role as decomposer (Nitzu *et al.*, 2008; Sari, 2014).

The knowledge of insect role in an agroecosystem is highly required. It related to management strategies against insects, since a mistake in identifying and confirmation on the status of an insect in the ecosystem could affect the decision for its management. *Omotemnus miniatocrinitus* beetle was mentioned as pests on snakefruit farms (Tjahjadi, 1989), although its larva was a feeder of decayed midrib of snakefruit (Abdurahim *et al.*, 2014).

Suitability of Omotemnus miniatocrinitus *Life on Parts of Snakefruit Crop*

The observation on the suitability of *O. miniatocrinitus* on parts of snakefruit was conducted using its fruit and midrib offal. The used fruit had around 60% ripeness; half of the fruit flesh and peel was removed and changed in every 7 days. The utilized midrib was chopped from the snakefruit crop and kept for 60 days before used. The midrib had it leaves removed, cut to fit in the container, and splitted out vertically. One obtained larva from the field was introduced into each 2 plastic container with 18×12 ×10 centimetres size, which one container will be filled with the half peeled snakefruit and the other one filled with the offal of snakefruit midrib. The larva was put between 2 parts of the splitted midrib. The midrib was watered if dried. Each treatment was repeated 30 times and development of insect larvae was observed. The growth conditions were maintained under temperature of 25ºC with humidity of 71−88%, while light and weight of consumed feed variable were neglected.

The development of *O. miniatocrinitus* larva occurred in the container that filled with offal of snakefruit midrib (Table 1). Larva which on the fruit could not complete their life cycle; they were only able to grow up until the end of larva stage and could not develop any further. Initially, larva consumed the pulp and peel of snakefruit. Although they experienced moulting, their feeding activity declined, wrinkled and then died. Meanwhile, larvae which were introduced into offal of snakefruit midrib could complete their life cycle; larvae were able to develop to adult. Larvae established a veil formed from the midrib in which pupae stage occurred and then adult left from the veil.

Those results showed that the right part of snakefruit crop for the growth and development of *O. miniatocrinitus* larvae was the offal of snakefruit midrib. The consumed nutrition was required for enhancing the growth and development of insect larvae (Chapman, 1995; Nation, 2001), nutrition content in plant depended on type of plant, plant parts, plant age and effect of weather season (Kogan, 1994). Insects employed contact assessment in selection process of

host plant, with the result of acceptance or refuse. The acceptance on host plant was the important decision due to the process would be continued with the feeding or egg placement, and it might affect on insect health and survival of their progenies (Schoonhoven *et al*., 2005).

The establishment of Omotemnus miniatocrinitus *Life on Normal and Injured Snakefruits*

The observation on establishment of *O. miniatocrinitus* was carried out using normal and injured snakefruits for 14 days. Eight obtained adult from the field were introduced into 2 plastic container of 18×12×10 centimeters size, in which 4 normal and deliberately injured fruit had been respectively prepared, 4 adults each. Each treatment was repeated 30 times.

The survivability of *O. miniatocrinitus* on the injured fruit tended to be stable and its size larger than the ones were normal (Table 2; Figure 1). This revealed that injured fruit was preferred by *O. miniatocrinutus*. Treatment on normal fruit exhibited that survival of *O. miniatocrinutus* decreased after 2nd to 7th day and tended to be stable after 7th to 14th day. The reduction of population after 2nd day was caused by the inability to feed. It expressed that normal fruit could not be used as feed for *O. miniatocrinitus*. After seventh until 14th day, the population of *O. miniatocrinitus* was inclined to be stable since physiological change happened in normal fruit, so that the fruit rotted. Such condition was preferred by *O. miniatocrinitus* as source of food. Food quality could influence the survival of the consuming insects. The insects would consume on suitable host although when they were placed on unpreferred or inappropriate host plant they were forced to feed or not eating at all since they did not have any choice (Chapman, 1995).

Effect of Injury on Population of Omotemnus miniatocrinitus *in Snakefruit Farms*

The observation on the effect of injury the snakefruit flesh on population of *O. miniatocrinitus* were using completely randomized design (CRD) with injury as factor and normal snakefruit as control in either GAP-implemented or non GAP-implemented snakefruit farms. The ripeness of the used snakefruit was about 50%, with 5 farms as replication, so that there

Table 1. Suitability of *Omotemnus miniatocrinitus* life on parts of snakefruit crop

Parts of crop	∑ replication (stage of larvae)	∑ adult	Percentage of survival (%)
Offal of snakefruit midrib	30	30	100
Snakefruit	30	0	0

Table 2. Establishment of *Omotemnus miniatocrinitus* life on normal and injured snakefruit

Snakefruit	∑ replication	∑ adult*	∑ surviving adult	means	Percentage of survival (%)
Normal	30	120	47	1.57	39.16a
Injured	30	120	117	3.90	97.50b

Remark: *Each replication consists of 4 adult insects on 4 snakefruits.
Number followed by dissimilar letter was significantly different according to t test.

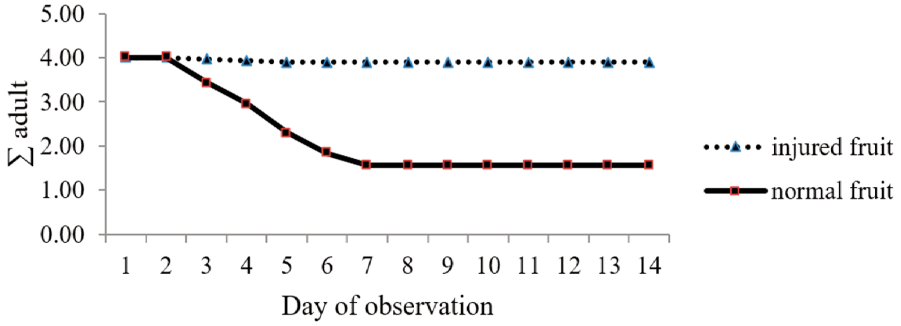

Figure 1. Effect of injury on snakefruit against survival of *Omotemnus miniatocrinitus*

were 20 observed farms. Sampling was carried out on each farm using diagonal scheme, with five sample sites for observation which were marked with plastic ropes, while the observation was consecutively performed every two days after first day treatment, i.e. on 1st, 3rd, 5th, 7th, 9th, 11th and 13th day.

The population of *O. miniatocrinitus* on injureed snakefruit was higher than the ones on control, i.e. 1.88 and 0.04, respectively. This result was statistically different significantly with ANOVA test at α 5% (Table 3). The observation on the field showed that the prevalence of *O. miniatocrinitus* was higher on injured snakefruits than on normal ones. *O. miniatocrinitus* was found after 5th until 13th day after injury, whereas it was seen on normal snakefruit only after 13th day (Figure 2). This indicated that *O. miniatocrinitus* was more interested on injured snakefruit. Sharp scales on the peel surface of snakefruit resulting *O. miniatocrinitus* in not prefering normal snakefruit. The prevalence of *O. miniatocrinitus* on normal snakefruit at 13th day which did not have wound was presumed occurred due to the physiological change such as increasing ripeness of the snakefruit that attract those insects.

The insect preference in selecting host plant required a process with five stages, i.e. the finding of host habitat, the finding of host, host introduction, host acceptance, and host suitability. The first four steps were correlated with insect behavior prior to food; while the latter involved physiological process after food was digested which will determined the feed suitability for the growth and development of the insect (Chapman, 1995; Kogan, 1994). The plants also naturally had a defence system to maintain themselves from the invasion of certain insect, such as the presence of trichomes and glandular trichomes which was potential to prevent the introduction of definite insects (Speight *et al.*, 1999). The morphological structures or plant tissue could affect the host plant selection. The presence of sharp scales on peel surface of snakefruit, hardness, and thickness of snakefruit might cause the avoidance behavior of insect. Such characteristics could be assumed as a function of plant defence (Schoonhoven *et al*., 2005).

Omotemnus miniatocrinitus *as Saprophagous Insects on Snakefruit Farms*

Naturally, the adult of *O. miniatocrinitus* was found on wounded, over-ripe and rotten snakefruits when the larvae were found inside the offal of snakefuit midribs. Observation result revealed that the suitable part of snakefruit crop for the development of *O. miniatocrinitus* was the offal of snakefruit midrib; and the life suitability and population of *O. miniatocrinitus* were higher on injured snakefruit. Therefore, it could be concluded that *O. miniatocrinitus* was more playing a role as

Table 3. Effect of injury on fruit against population of *Omotemnus miniatocrinitus* in GAP-implemented and non GAP-implemented areas

Population	Treatment		Average
	Control	Injury	
GAP-implemented area	0.00	1.72	0.86a
Non GAP-implemented area	0.08	2.04	1.06a
Average	0.04a	1.88b	(-)

Remark: Number followed by dissimilar letter was significantly different according in the same row or column to further test of leas significance different at α 5%. (-) = no interaction.

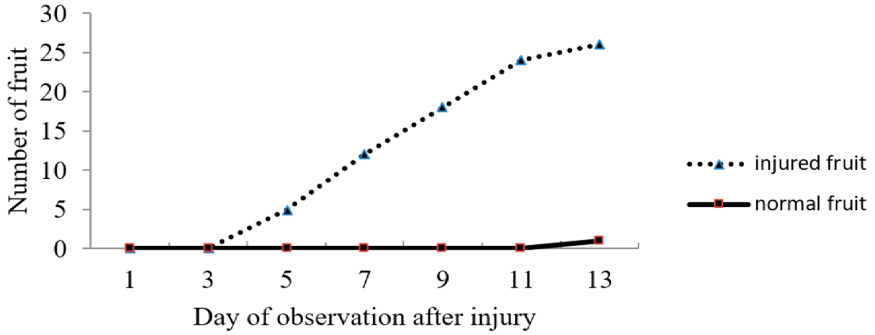

Figure 2. The prevalence of *Omotemnus miniatocrinitus* on snakefruit

saprophagous insect rather than potential pest on snakefruit farms because it could help the decaying process of chopped snakefruit midrib and the prevalence of *O. miniatocrinitus* on snakefruit farms was found to be on wounded snakefruit which have little economic value.

LITERATURE CITED

Abdurahim, A., N. Saptayanti, & E. Octavia. 2014. Pedoman Pengelolaan OPT Ramah Lingkungan pada Tanaman Salak. Direktorat Perlidungan Hortikultura Direktorat Jenderal Hortikultura. Jakarta. 59 p.

Borror, R.J., C.A. Triplehorn, & N.F. Johnson. 1992. I*ntroduction to the Study of Insects* (*Pengenalan Pelajaran Serangga*, Alih bahasa: Soetiyono Partosoedjono). Sixth Edition. Gadjah Mada University Press, Yogyakarta. 1083 p.

Chapman, R.F. 1995. Mechanics of Food Handling by Chewing Insects, p. 3−31. *In* R.F. Chapman, & G. de Boer. Regulatory Mechanisms in Insect Feeding. Springer-Science & Business Media Dordrecht. Chapman & Hall, New York.

Kogan, M. 1994. Plant Resistance in Pest Management, p. 73−128. *In* R.L. Metcalf & W.H. Luckmann. *Introduction to Insect Pest Management*. Third Edition. John Wiley & Sons, Inc., New York.

Nation, J.L. 2001. *Insect Physiology and Biochemistry*. Second Edition. CRC Press, Boca Raton. 544 p.

Nitzu E., A. Nae, & I. Popa. 2008. The Fauna of Soil Beetles (Edaphic Coleoptera) as a Sensitive Indicator of Evolution and Conservation of Ecosystems. A Study on the Altitudinal Gradient in the Rodnei Mountains Biosphere Reserve (The Carpathians). *Monographs* 12: 405−416.

Sari, M. 2014. Identifikasi Serangga Dekomposer di Permukaan Tanah Hutan Tropis Dataran Rendah (Studi Kasus di Arboretum dan Komplek Kampus Unilak dengan Luas 9,2 Ha). *Bio Lectura* 2: 63−72.

Schoonhoven L.M., J.J.A. van Loon, & M. Dicke. 2005. *Insect-Plant Biology.* Second Edition. Oxford University Press, New York. 421 p.

Speight M. R, M. D. Hunter, & A.D. Watt. 2008. *Ecology of Insects: Concepts and Applications.* Second Edition. Wiley-Blackwell, New Jersey. 628 p.

Tjahjadi, N. 1989. *Bertanam Salak*. Kanisius, Yogyakarta. 39 p.

Untung, K. 2006. *Pengantar Pengelolaan Hama Terpadu.* Gadjah Mada University Press, Yogyakarta. 346 p.