

定地点で常に調査をつづけ、事前に殺虫剤の選定のできるような組織が必要なのではないかと考える。

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Résumé

L'auteur a étudié la sensibilité à plusieurs sortes d'insecticides chez les mouches domestiques, recueillies dans 9 régions à la Préfecture Kanagawa. Les résultats obtenus ont montré que la Mouche de l'espèce Missaki possède une forte résistibilité à Sumithion ($92.538\mu\text{g}$), suivi par Diazinon ($26.089\mu\text{g}$) ainsi que d'autres insecticides en phosphore organique que DDVP.

Pour détruire cette résistibilité, il est évidemment désirable d'associer S-421 à Sumithion, ou utiliser Sumithion mélangé avec Pyrethroides. On a trouvé l'effet synergique présent entre Sumithion et autres insecticides, en ce qui concerne l'espèce qui possède une forte résistibilité.

The Relationship of the Larval Density to the Uric Acid Content in the Armyworm, *Leucania separata* Walker. Hajime IKEMOTO (Tokyo Prefectural Isotope Research Station, Setagaya, Tokyo) Received November 9, 1972. *Botyu-Kagaku*, 38, 40, 1973.

9. 飼育密度を異にしたアワヨトウ幼虫の尿酸含量について 池本 始(東京都立アイソトープ総合研究所, 東京都世田谷区) 47. 11. 9 受理

黒色型幼虫(高密度飼育)の皮膚の尿酸含量は白色型幼虫(単独飼育)の皮膚よりも少ないが、体液の尿酸含量は皮膚の場合とは逆の関係にあった。皮膚の尿酸含量は老熟期にいちじるしく減少するが、このような変化は老熟期になると皮膚が透けてみえることと関係があるようである。

Yoshitake and Aruga (1952) reported that the increasing the content of melanin pigment in the larval integument of the silkworm makes the less content of uric acid. However, in the haemolymph, it seemed to be a negative relation to the integument. In the present paper, the difference of the uric acid content was compared by using the isolated light (pale) larvae and the gregarious black one of the armyworm, *Leucania separata* Walker.

Material and Methods

The larvae used in this study were reared on the leaves of corn plant in the laboratory by means of the method of Ikemoto (1971).

Uric acid content was determined by the colorimetric method of Caraway (1955). To 0.1 ml of haemolymph, distilled water was added to make a whole volume up to 1 ml. To this sample, 9 ml of the precipitating reagent (100 ml of 10% sodium tungstate diluted with 700 ml

of water and 100 ml of 2/3 N sulfuric acid) was added. The supernatant obtained after centrifuging was used for the determination of uric acid in the larval haemolymph.

Dorsal region of the integument was removed from other organs and washed with distilled water and removed the excess water with filter paper. The integuments of 0.2 to 0.3 gm were homogenized, making finally up to 10 ml with distilled water. To 0.2 ml of the homogenate distilled water was added to make a whole volume up to 1 ml. The method used for the determination of uric acid in the integument was the same as that adopted to the haemolymph. These experimental procedures were all carried out at 3°C. To 5 ml aliquots of the supernatant, 1 ml of 10% sodium carbonate and 1 ml of 1% sodium tungstate were successively added and incubated for 30 minutes at 25°C. The uric acid content was determined by measuring the extinction of the reaction mixture at 700 mμ.

Results and Discussion

Figure 1 shows the changes of the uric acid content in the integument of both types during a period from the early stage of the sixth instar larvae to the beginning of the prepupal stage. The uric acid content in both types was high at the beginning of the sixth instar larvae. On the following day, its content decreased to a steady level slightly below its initial value, keeping it over a period of 2 days until the sixth instar larvae reached 3 days old and then decreased quickly from the mature stage to the prepupal stage.

The uric acid content in the integument of the gregarious black larvae was much less than that of the isolated light one. This result presents an evidence to support the Yoshitake and Aruga's hypothesis (1952) that the more the content of melanin pigment in the integument makes the less the content of uric acid.

The integument of the isolated light larvae of the armyworm became translucent at the mature larval stage. However, the integument of the gregarious black larvae was opaque, owing to the deposition of melanin pigment. It is of interest that the initiation of translucence of the integument corresponds closely to the time of the remarkable decrease in uric acid in the integument. It has been known that the uric acid

content in the translucent epidermis of the oily mutants of the silkworm is much less than that in the epidermis of the normal one (Jucci 1932, Shimizu 1943).

From these facts it seems that the translucence of the larval integument of the armyworm during the mature larval stage is attributable to the occurrence of smaller amounts of uric acid in the epidermal cells of the larvae, as shown in oily mutants of the silkworm (Tsujita and Sakurai 1964).

As shown in figure 2, the uric acid content in the haemolymph is in negative relation to that in the integument, namely the uric acid content in the haemolymph of the gregarious black larvae is much more than that of the isolated light larvae. It seems likely that in the gregarious black larvae more uric acid is accumulated in the haemolymph, while that is less in the integument.

The uric acid content in the haemolymph of each type was high at 1 day old larvae of the sixth instar stage, being followed by a decrease on the next day, and increased to a high level at 3 days old larvae. Then it decreases towards the period from the mature larval stage to the prepupal stage.

Summary

1. The uric acid content in the integument of

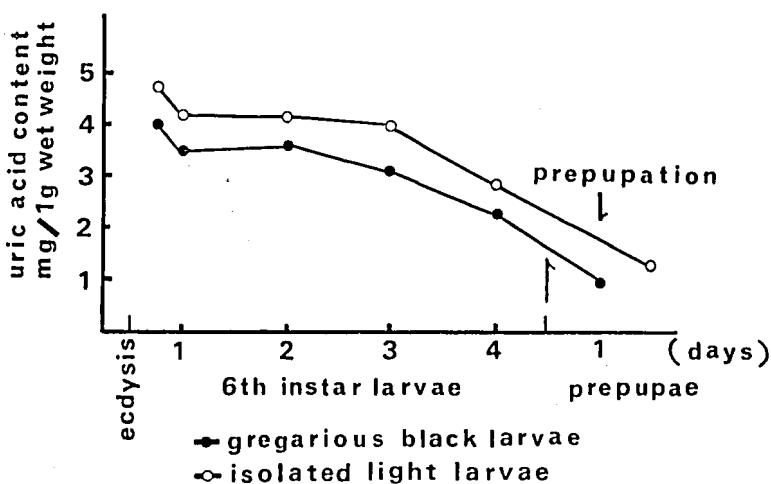


Fig. 1. The changes of the uric acid content in the integuments of the armyworm.

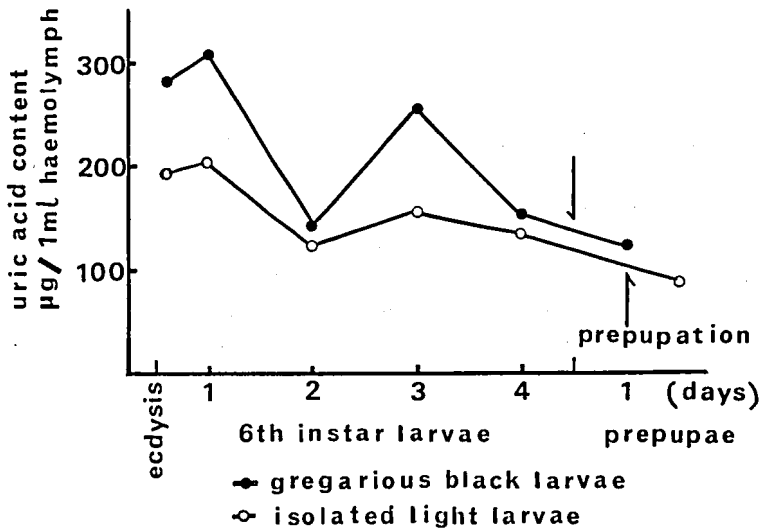


Fig. 2. The changes of the uric acid content in the haemolymph of the armyworm.

the gregarious black larvae is less than that of the isolated light larvae.

2. The uric acid content in the haemolymph is reverse relation to the integument.
3. The uric acid content in the integument decreases significantly at the time of larval maturation. The change of the uric acid content seems to be related to the translucence of larval integument at the mature larval stage.

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抄 録

アブラムシの警報フェロモン

Aphid Alarm Pheromone: Isolation, Identification, Synthesis. W. S. Bowers, L. R. Nault, R. E. Webb and S. R. Dutley, *Science*, 177, 1121 (1972).

アブラムシの類は、捕食者に攻撃されると腹部の尾角から液を出し、仲間には知らせようとする。この警報フェロモンの化学構造を知るため、アブラムシをエーテル：メタノール（3：1）中で磨砕し、フロリジルカラムクロマトグラフィーで分離した。Hexane 可溶部のみ活性であったことから、炭化水素と考えられた。硝酸銀－フロリジルカラムクロマトグラフィーで分離し、GC-MSで分析したところ、分子イオン $m/e 204$ を与えた。これは、アリの Dufour 腺から単離された *trans*、

trans- α -farnesene と同様の化合物と考えられた。

そこで合成が簡単な *trans*- β -farnesene が合成された。機器分析の結果は、このものが、アブラムシの警報フェロモンと同じものであることを示した。そこで *trans*- β -farnesene を10種のアブラムシに対して生物検定したところ、天然物と同様の活性を示した。以上のことから、バラヒゲナガアブラムシ、エンドウヒゲナガアブラムシ、ムギフタマアブラムシ、ウタアブラムシの警報フェロモンは、*trans*- β -farnesene であることがわかった。このものが、他の6種に対しても活性を示すことから、*trans*- β -farnesene は、今までにわかったフェロモンのうちでは、最も広範囲な種にわたって、作用をおよぼすようである。

(北村実彬)