

Use of the Microbial Pesticide Hasumon Killer® Against *Spodoptera litura*®

Yuki Sobue and Hiroshi Endo

Ibigawa Kogyo Co., Ltd., 2-31, Mangoku, Ogaki, Gifu, 503-8552, Japan

Email: hendo@ibiko.co.jp

The common cutworm, *Spodoptera litura* (Fabricius) (Lepidoptera: Noctuidae) (Fig. 1) is a serious harmful insect because the larvae attacks more than 80 kinds of plants, including vegetables (Fig. 2), flowers, and fruit trees. In Japan, the expanding of the damage started in the second half of 1950s. In the warm area of central Kanto district to the south, it has occurred continually to the present. This causes considerable concern because *S. litura* can overwinter in plastic and glass greenhouses built mostly from the 1950s and the increasing temperatures from global warming.

Although many depend on controlling *S. litura* larvae by spraying chemical pesticide, there are many examples of pesticide resistance occurring. In addition, chemical pesticide use may be restricted by the number of spray application times and crops on which it can be used even if it is still effective.

Therefore, if new nonchemical control materials can be developed to replace current chemical pesticide treatments we felt that it could contribute to better farm worker's management of the pest and offer consumers food free of chemical pesticides.

Ibigawa Kogyo Co., Ltd. then developed the microbial pesticide Hasumon killer® from *Spodoptera litura* nucleopolyhedrovirus (SpltNPV) which has a strong insect-killing activity against *S. litura* in collaboration with Gifu Prefectural agricultural technology center.

The SpltNPV is an insect virus and belongs to the genus *Nucleopolyhedrovirus* of the family *Baculoviridae*. It is very stable since the viral particles are occluded in a protein crystal. When *S. litura* larvae ingest it, the occlusion body dissolves in the high alkali conditions of the digestive organs, the cells are infected with the emitted viral particle, so their whole bodies were infected and they died (Fig. 3).

We used a novel SpltNPV isolated in Japan, which has a high insect-killing activity, as the active ingredient of Hasumon killer (Kamiya et al., 2004). Because of this the control effect is higher than conventional insect virus formulations and other microbial pesticides. Regarding this point, it has been shown by studies carried out at examination sites around the country (Kamiya and Sobue, 2007). Viral insecticides such as SpltNPV have the advantage of being safe for humans and non-target insects, such as honeybees, and soil microbes and plants. The safety to humans is also very high from the safety examination studies using mammals, such as mice.

We applied to the Ministry of Agriculture, Forestry, and Fisheries for the agricultural chemicals registration to sell Hasumon killer in March of this year. If everything goes smoothly, we will acquire agricultural chemicals registration for the following five crops: soybean, green soybean, strawberry, perilla, and basil by next year (Table 1).

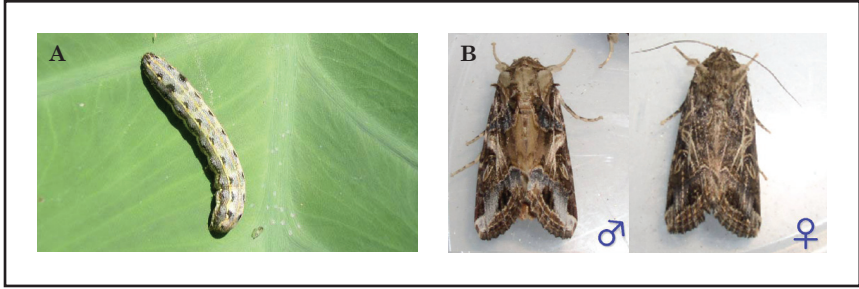


Figure 1. *Spodoptera litura* (Fabricius) A, larva; B, imago male (left) and female (right).



Figure 2. Damaged leaf of kale (*Brassica oleracea* L. var. *acephala* DC.).



Figure 3. Dissolved body of *Spodoptera litura* by Hasumon killer.

Table 1. The range of application disease and insect pest name, and usage.

Crop name	Application disease and insect pest name	Dilution multiple	Operating fluid volum	Use time	Usage
soybean					
green soybean					
strawberry	<i>Spodoptera litura</i>	1,000 times	100~300 L/10 acre	Early stages of larva generating	Spraying
perilla					
basil					

LITERATURE CITED

- Kamiya, K., and Y. Sobue.** 2007. Development of a microbial pesticide with selected clones of nuclear polyhedrosis viruses isolated from the common cutworm in Japan. *Plant Protection* 61(4):210–213.
- Kamiya, K., J. Zhu, M. Murata, B.A. Lavina-Caoili, M. Ikeda, M. Kobayashi, and S. Kawamura.** 2004. Cloning and comparative characterization of three distinct nucleopolyhedroviruses isolated from the common cutworm, *Spodoptera litura* (Lepidoptera: Noctuidae) in Japan. *Biol. Control* 31:38–48.