A Granulosis Virus from *Sesamia nonagrioides*

A granulosis virus that attacks the larval stages of *Sesamia nonagrioides* (GVSn) resulted in the loss of many cultures in the laboratory. A granulosis in the close species *Sesamia cretica* has been reported already (C. Vago, *Entomophaga* 1, 82-87, 1956). However, neither a description of the disease symptoms nor of the characteristics of the virus has been given elsewhere.

Granulosis-diseased larvae of *S. cretica* were reported in Israel in 1960, (E. A. Steinhaus and J. P. Dineen, *J. Insect Pathol.* 2, 55-56, 1960) and in 1965 (G. M. Thomas and G. O. Poinar, Jr., *Hilgardia* 42, 261-360, 1973). The disease in the larvae of *S. nonagrioides*, and some of the characteristics of the GVSn, are described herein.

Healthy and diseased larvae were reared on an artificial diet (V. Melamed-Madjar, Unpubl.) at 25°C. GVSn-suspension was prepared by inoculating larvae from a culture that originated from one mother with virus from one GVSn-infected larva. Capsules from decomposing larvae in distilled water were filtered through muslin and centrifuged at 500g for 10 min to remove body debris. The supernatant was re-centrifuged twice at 2500g for 20 and 30 min, respectively. The pellet was resuspended in distilled water. A portion of the suspension was lyophilized, and 1 ml of it contained 10 mg of dry capsules. The virus particles were released by treatment with 0.05 M Na₂CO₃ plus 0.05 M NaCl for 60 min at room temperature. The succeeding steps were similar to those employed by R. E. Teakle (*J. Invertebr. Pathol.* 23, 127-129, 1974). Observations were made with a JEM 7A electron microscope, and the measurements are presented in Table 1.

The measurements indicate that capsules and virus particles resemble in their size other granulosis viruses found in Noctuidae, e.g., in *Agrotis subterranea* the capsule size is 500 × 300 nm (E. A. Steinhaus and G. A. Marsh, *J. Insect Pathol.* 2, 115-117, 1960).

In many released virus particles it can be seen that the virus rod is bent within its developmental membrane. It seems that the developmental membrane is rigid and keeps the virus rod from expanding outside the membrane. Naked viruses are known to be longer than those still included in their developmental membrane (A. E. Teakle, loc. cit.).

For morphological studies, two groups of larvae were used: the first was 1 day old and the other 10-days old. The larvae were fed an artificial diet containing a lethal concentration of the GVSn, for 48 hr. The larvae were then transferred to a noninfective diet for the rest of their development.

In the larvae inoculated on their first day, loss of appetite and retarded growth were observed 4 days later. Many of these larvae died within the first week without any visible symptoms, but many capsules were observed in the electron microscope. The first obvious symptoms in the surviving larvae of the two groups appeared 6 days after inoculation. The larvae changed from the usual brownish-yellow to a creamy white and

<table>
<thead>
<tr>
<th>TABLE 1</th>
<th>The Size of Capsules and Virus Particles of a Granulosis Virus Disease from the Corn Borer <em>Sesamia nonagrioides</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number measured</td>
<td>Mean size ± SE (nm)</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>Capsules</td>
<td>103</td>
</tr>
<tr>
<td>Virus particles (included within the partly dissolved capsule)</td>
<td>93</td>
</tr>
<tr>
<td>Virus particles (released)</td>
<td>93</td>
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FIG. 1. *Sesamia nonagrioides* larvae. The upper is a healthy larva, the middle is an infected larva 14 days after inoculation, and the lower is a larva which died of granulosis.

sometimes even pink color. The coloration started from the posterior and anterior side of the abdomen to cover the rest of it as the disease progressed (Fig. 1).

The insect became sluggish and lost its appetite. Several infected larvae remained at the size reached by them during the first week after inoculation.

A survey of the incidence of diseased *S. nonagrioides* larvae, and the possible influence of the disease on the population of the insect, is being carried out in corn fields.

The authors thank Dr. M. Bar-Joseph (Virus Laboratory, Volcani Center) for his valuable advice.

This is contribution No. 236-E of the 1975 Series from this center.

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*Received January 3, 1975*