



 Research Article

THE IMPORTANCE OF USING ENTOMOPATHOGENIC NEMATODES AGAINST THE MEALYBUG (PSEUDOCOCCUS COMSTOCKI KUW.) PEST

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ABSTRACT

This research paper is concerned with determining the biocontrol potential of entomopathogenic nematodes against the Comstock worm in laboratory conditions, presents an optimal standard research design for the use of virulent species of beneficial nematodes against the pest, and provides information on the stages of experimental work organization. This scientific information is important in bringing safe biological control technology against Comstock worm to the field workers in our country.

KEYWORDS

Comstock worm, entomopathogenic nematodes, heterorhabditis spp, steinernema spp, white trap, suspension.

INTRODUCTION

In Uzbekistan, the integrated control system is widely used in the fight against pests of

agricultural crops. Its essence is to protect crops by using biological control methods, which are

harmless to the environment, people and animals, rationally using agrotechnical, mechanical, and physical control methods, and using chemical methods as an exception due to necessity.

The advantages of the biological control method are that the cultivation of agricultural products as far as possible free of chemical preparations, that is, pesticides, serves not only human health, but also the cleanliness of the environment and the preservation of many types of useful living creatures living in nature.

For this purpose, in the Republic of Uzbekistan, the first stage experiments of the use of entomopathogenic nematodes (EPN), which are considered useful and low-cost and are being put into production, were conducted in laboratory conditions.

EPNs were first identified by Steiner in 1923 under the name *Aplectana kraussei* (now *Steinernema kraussei*). Today, 96 *Steinernema*, 1 *Neosteinernema*, 21 *Heterorhabdites* species have been identified. They are classified mainly in the closely related families *Heterorhabditidae* and *Steinemematidae*.

In order to use EPNs against the Comstock worm, first of all, the step of extracting EPNs from soil samples was carried out. For this, soil samples were taken from the greenhouse where cultural and decorative flowers are grown belonging to the household in Binokor Kurgan, Nyi Hayat District. Soil samples taken from a depth of 30 cm were placed in 500 ml plastic bottles and covered with lids.

The obtained soil sample was brought to the laboratory, emptied into trays and cleaned of unnecessary waste. Soil moisture should be 60-70% to extract EPNs from the soil. Distilled water was sprinkled using a water sprayer in order to create the required moisture in the soil. Moistened soil was put back into pots, and 15 wax moth worms were placed on it. Jars were covered with lids and labels were attached. The label indicated the address of the soil sample brought and the date of the experiment. The finished samples were left in a thermostat at a temperature of 20 0 C for four days.

After the specified day, the soil samples placed in a thermostat for the purpose of extracting EPNs were examined in order to determine the level of infection of the wax moth with EPNs. Soil samples in 500 ml plasma jars were poured into a tray, wax moth worms infected with EPNs were isolated and placed in petri dishes filled with water. Live wax moth larvae that had not been infected with EPNs were left in the soil, re-potted and placed back into the thermostat.

White trap method was used to isolate nematodes from wax moth worms infected with EPNs. For this, a jar lid was placed on a petri dish and a filter paper was placed on it. With the help of tweezers, the wax moth worms were arranged in a circular pattern and distilled water equal to half of the petri dish was added for evaporation. It was covered and placed in a thermostat at a temperature of 20 0 C. After each experiment, a label was attached and the date of the experiment was recorded.

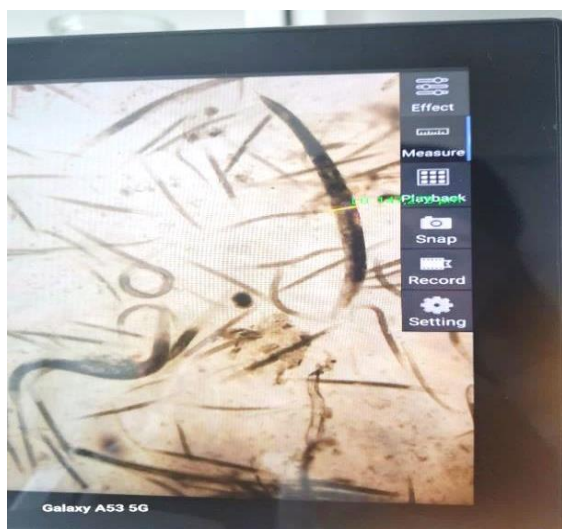


Figure 1. White trap method entomopathogenic nematodes incubation to do

Seven days later, the experiment placed in the "White Trap" was removed from the thermostat and studied under a microscope to determine the level of infestation of wax moth worms with EPNs, and it was found that EPNs of various stages were developing. About 30-40 ml of distilled water was added to the isolated EPNs to form a suspension ready for use against Comstock worm.



Figure 2. Separately received entomopathogenic nematodes isolates

In order to use the prepared suspension against Comstock worm in laboratory conditions, filter paper was placed in 3 petri dishes, and 10 Comstock worm larvae were placed in each petri dish. For the first experiment, *Heterorhabditis* spp was pipetted from a suspension of 2 ml of

EPN and inoculated onto Comstock worm larvae. For the second experiment, *Steinernema* spp was withdrawn from the suspension of EPN using a 2 ml pipette and inoculated onto Comstock larvae. As the third experiment was taken as a control option, only distilled water was sprayed. The date

of the experiment and the name of the EPN used for the lesion were recorded on top of all three

experiments. It was left for 2 days in an environment with a room temperature of 28 0 C.



Figure 3. Local entomopathogenic nematodes using Comstock worm laboratory conditions damage

After the specified period, the experiment was controlled. *Heterorhabditis* spp. When examining the first experiment conducted on the basis of EPN suspension, it was found that 5 out of 10 larvae of Comstock worms of different ages were dead. The dead larvae were 1st, 2nd, and 3rd instar larvae, which were black in appearance and had broken side growths. The remaining large, mature worms were observed to be barely moving.

For the second experiment, a suspension prepared on the basis of *Steinernema* spp EPN was used, and this experiment was also studied in turn. 3 out of 10 Comstock worms at different stages were dead, and they were young larvae. 2 larvae of the 3rd age and 5 worms in the mature imago state were moving in the market.

A third control was taken and when the normal distilled water spray experiment was examined, each of 10 larvae of different ages were alive, and some imago-stage Comstock worms were found to have laid eggs.

To continue the experiment, 1 ml of the suspensions prepared on the basis of the EPNs corresponding to the experimental options 1 and 2 were withdrawn and sprayed with a pipette. Distilled water was used in 3 control experiments. Each experiment was covered and left for another 2 days in a room with a temperature of 28 0 C.

When the first experiment based on the suspension of *Heterorhabditis* spp EPN was examined after the specified period, it was found that all Comstock worms were killed.

When examining the second experiment conducted on the basis of the suspension of *Steinernema* spp EPN, it was observed that 2 of the adult Comstock worms were moving and the rest of the worms were dead.

A control experiment using plain distilled water showed that Comstock worms of all stages were alive and could be seen moving freely.

A laboratory experiment to determine the effectiveness of EPNs against the Comstock worm can be concluded that *Heterorhabditis* spp EPNs are the most effective species. To get a general and clear conclusion, two more repetitions of the laboratory experiment are required. Research processes aimed at identifying the most effective EPNs against the Comstock worm are being carried out in stages.

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