The host-finding behaviour of *Venturia canescens* (GRAVENHORST) (Hymenoptera: Ichneumonidae), a potential natural enemy for the biological control of *Corcyra cephalonica* (STAINTON) (Lepidoptera: Pyralidae) in stored bagged rice

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INTRODUCTION

Venturia canescens (Hymenoptera: Ichneumonidae) is a solitary koinobiont endoparasitoid that is known to attack and successfully develop within the larvae of several lepidopterous pests of stored products, mainly pyralids. *V. canescens* has primarily be been used as a model organism for population dynamics, evolutionary ecology and immunology, amongst other studies. The rice moth *Corcyra cephalonica* is an important pest moth on stored rice in tropical regions.

GOAL

The present study examines the potential of *V. canescens* in biological control of its host *C. cephalonica* in bagged rice at a small scale storage environment.

MATERIAL AND METHODS

Venturia canescens

Webbings formed on the jute bag

Daily parasitism of *C. cephalonica* with *V. canescens* were investigated in the laboratory using Petri-dishes at 25°C and 65.5-70% rh (see fig.1). The host *C. cephalonica* were reared in a growth cabinet at 25°C (LD 16:8 h) and 65±5% RH in 1-litre glass jars. The original population of the parasitoid *V. canescens* was obtained from Biological Consultants Ltd. in Berlin. Approximately one hundred fourth-to fifth-instar moth larvae were placed in each jar together with five adult wasps. This procedure was repeated every four days. The glass jars were left until adult wasps emerged.

5 kg jute bag containing rice grain artificially infested with *Corcyra cephalonica* larvae

Four jute bags were placed on a small pallet and introduced into a climatic chamber (room size 13 m^2, temperature 26°C and 65.5% relative humidity). 35 moth larvae aged four weeks were introduced into each of the bags. The openings were sealed. All bags remained for five days for larvae of the moths to further develop and form webbings inside and outside the bags. Only four bags were additionally treated with *V. canescens* and transferred in one chamber. 25 adult *V. canescens* aged five days were released in the chamber. The other four bags were left only with *C. cephalonica* as control in another chamber. The whole experiment was replicated five times. After 15 days, the rice from all the jute bags was transferred into glass jars. Parasitisation of *C. cephalonica* larvae was then expected to be completed. Additionally, areas on the jute bags where moth webbings had been located were cut out and placed in jars. The emergence of *V. canescens* and *C. cephalonica* was recorded every two days in rice samples either treated or untreated until the 20th day.

RESULTS

V. canescens was able to parasitise the hosts both on and inside the jute bags in the experimental chamber. The wasps used their ovipositors to sting through the jute fibre as well as through the *C. cephalonica* webbings. On average, only 27.1% of 35 larvae emerged as moths from the treated samples (Fig. 2). In the samples that were not exposed to *V. canescens*, out of 35 larvae of *C. cephalonica* 95% on average developed into adult moths. *V. canescens* reduced the emergence of *C. cephalonica* significantly in bagged rice.

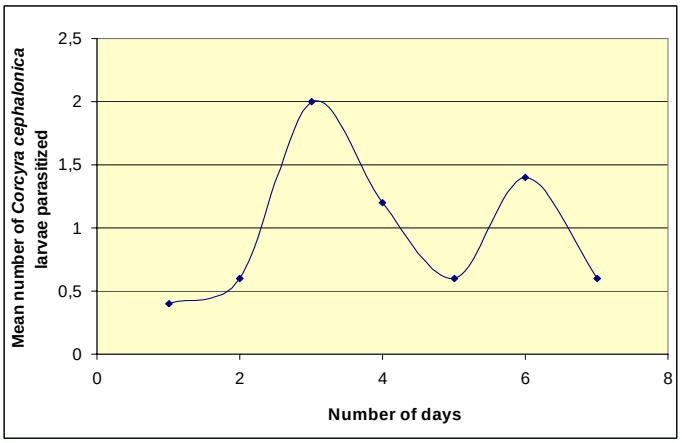

Figure 1: Parasitism of *C. cephalonica* larvae by unfed (no honey) *V. canescens* adult aged 0-7 days old in grain of rice at 25.5°C, 65.5% rh.

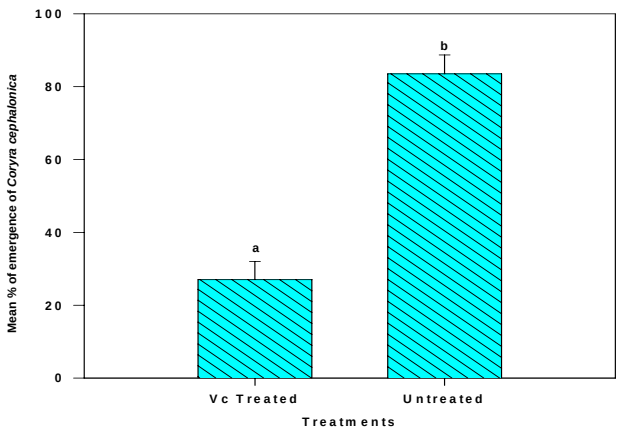

Figure 2: Mean percentage emergence of *C. cephalonica* adults (+SD) with or without exposure to *V. canescens* (P=<0.001), student-Newman-Keuls Test

DISCUSSION

Results demonstrate the host-finding ability and the successful parasitism of *V. canescens* and its potential for biological control of *C. cephalonica* in bagged rice. The surviving larvae may have hidden deep inside the jute bag not accessible to the wasps as shown I a previous experiment. However, *V. canescens* were able to sting through the meshes of the jute fabric with the help of its ovipositor.

CONCLUSION

The use of biological control agents in suppressing bagged stored product pests could become a valuable alternative to the use of synthetic pesticides. Therefore, it is important that appropriate technology is developed to promote biological control of stored product.

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