

9. Stored product pests

9.1 Official examination of consignments 2000

DPIL examines consignments of grain and other dried plant products intended for export. Based on the results of these examinations, the Plant Directorate of the Ministry of Food, Agriculture and Fisheries issues a phytosanitary certificate for countries requiring such certification. In 2000 a total of 1,085 consignments were examined: 339 lots of grain, 86 lots of malt, 147 lots of pulses (dried peas and beans), 100 lots of tobacco and 443 consignments of other products, mainly potato starch. Live insects were found in 1.4% of the consignments, all except one in lots of grain. The following species were found: *Sitophilus granarius* in the great majority of the infested samples, *Ptinus tectus*, *Oryzaephilus surinamensis*, *Cryptolestes ferrugineus*, and in one case two species of fungus beetles (*Cryptophagus* sp. and *Cartodere* sp.).

L. Stengård Hansen

9.2 Biological control of the Mediterranean flour moth *Ephestia kuehniella*

The year 2000 was the final year of this project, the aim of which was to investigate possibilities for biological control of *Ephestia kuehniella* in industrial flour mills.

In previous years of the project two natural enemies have been subjected to laboratory studies, the egg parasitoid *Trichogramma turkestanica* and the egg predator *Blattisocius tarsalis*. Both species showed biological characteristics that made them eligible as candidates for field trials in flour mills. Among the traits that were considered important was their ability to be active, reproduce and develop at temperatures below 20°C.

The parasitoid *T. turkestanica* was introduced in four areas in one mill. Introductions were carried out weekly, starting in April. Flour moth population densities were monitored by the means of pheromone traps and parasitoid activity was checked by the means of sentinel host eggs. The overall results of the field trial ranged from complete absence of flour moths to much higher densities compared to previous years where chemical control was conducted with pyrethrin. These results are being analysed to determine whether the parasitoids were responsible for the effect in one or two of the areas.

The predatory mite *Blattisocius tarsalis* was introduced in one mill. The trial was carried out in an 1100 m³ room with a 600 m³ silo containing bran. This specific area had always experienced moth problems, which had been regulated by space treatments with pyrethrin when required. Nearly 140,000 mites were released from April to September at weekly intervals. Flour moth population densities were monitored by the means of pheromone traps. This year the population density was the lowest recorded in the last five years. As a consequence the mill did not find it necessary to carry out chemical control.

L. Stengård Hansen and P. Sejerø Nielsen

9.3 Ecological constraints and spatial distributions of an introduced agricultural pest *Prostephanus truncatus* in natural habitats in West Africa

The final months of this project were used for data analysis, preparation of manuscripts and compilation of C. Nansen's Ph.D. thesis, which will be defended in 2001.

C. Nansen and L. Stengård Hansen

9.4 Rapid analysis methods for detection of pests and moulds in stored grain

Near infrared transmittance spectroscopy (NIT) is commonly used by commercial grain elevators in the Nordic countries for determination of protein and moisture content in the grain. The instruments are often connected in national networks which can be used to transfer calibration models between instruments. There is great interest in including hygienic parameters (mycotoxins, pests and other types of contamination) in this analysis process.

The DPIL has participated in a one-year study of the potential of NIT for detecting contamination due to moulds and pests in grain. Two pest species were included in the study: the granary weevil *Sitophilus granarius* and the storage mite *Lepidoglyphus destructor*. In this preliminary study series of grain samples with varying levels of infestation were prepared and analysed on a NIT instrument. The spectra were subsequently analysed in relation to the actual numbers of pests in the sample to determine the degree of correlation. Preliminary results of the study indicate that it is difficult to use NIT in the present procedure for detecting granary weevils at acceptable infestation levels. The results with storage mites were more encouraging; a good correlation was found between actual and predicted mite densities.

The study was carried out in collaboration with Danish and Swedish research institutes and commercial companies, with H. Pettersson at the Swedish Agricultural University, Uppsala as project manager. The work was supported by the Nordic Industrial Fund. Further funds will be sought to continue the collaboration concerning storage mites and mycotoxins.

L. Stengård Hansen and M. Kristensen

9.5 Acoustical monitoring of insect pest species

This project was granted in December and will run from 2001 to 2003. The purpose of the project is to develop methods for a rapid, reliable and practical acoustic monitoring of the larvae of the grain weevil (*Sitophilus granarius*) in grain stores and populations of flour beetles (*Tribolium confusum*) inside building structures or machinery in flour mills.

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