

72- Summary of

**STUDIES ON THE CONTROL OF STORED PRODUCT
INSECTS**

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V.I. Summary

Wheat (*Triticum aestivum* L.) is an important agricultural crop. It is cultivated for local consumption. The rice weevil (*Sitophilus oryzae*), the wheat weevil (*Sitophilus granarius*) family (Curculionidae) order (Coleoptera) and lesser grain borer (*Rhizopertha dominica*) (Bostrichidae) order (Coleoptera) have become an important storage products insects (Shemaise 1996)

1- Contact toxicity of two formulations of spinosad (Tracer 24 % SC) to adult of three stored mentioned insects at 7 and 14 days exposure periods.

2- Assess the effect two formulations of *Bacillus thuringiensis* (Dipel-2X 6.4% WP and Eco-tibia 96 % EC) against of three stored insects at 7 and 14 days exposure periods.

3- The possible use of Natural 96% EC (soybean oil) type in managing the mentioned three stored products insects at two exposure 7 and 14 days.

4- Efficacy of thiomethoxam (Actra 25% WP) was evaluated as grain treatment for controlling three the mentioned stored product insects after two exposure periods 7 and 14 days.

5- Effectiveness of organophosphates (Malathion 1% Dust) against the three mentioned stored product insects during two exposure periods 7 and 14 days.

6- Bioinsecticide residually on some biological aspect on *S. oryzae* during stored period .

7- Joint action effect of Soybean Oil and spinosad (Tracer 24% SC), *Bacillus thuringiensis* (Dipel-2X 6.4% WP), thiomethoxan (Actra 25% WP) and organophosphates (Malathion 1% Dust) on *S. oryzae*.

8- Effect of surface treatment of wheat grain with tested bioinsecticide on the seed germination and water absorption on wheat grains .

The Results Summarized As Followed :

1- Spontor (25% WG) was more toxic than Tracer (24% SC) after 7 days and 14 days from treatment for the three tested insects *S. granarius*, *S. oryzae* and *R. dominica*. While Tracer (24% SC) was more toxic than Spontor (25% WG) at LC₅₀ and LC₉₅ after 7 and 14 days.

2- *S. oryzae* adult was highly susceptible to Spontor (25% WG), followed by *S. granarius* and *R. dominica* at 7 days of treatment. While after 14 days *S. granarius* was more susceptible than *S.*

oryzae to this product followed by *R. dominica*, respectively. Also *S. granarius* adult was more susceptible than *S. oryzae* followed by *R. dominica* at 7 and 14 days. These results suggested that the two formulations of spinosad are to be potential grain protectant for *S. oryzae*, *S. granarius* and *R. dominica*.

- 3-The insecticidal effect of the two formulations of *Bacillus thuringiensis* (Dipel-2X 6.4% WP and Ecotech-Bio 10% EC) against three insects, *S. oryzae*, *S. granarius* and *R. dominica* adults after 7 and 14 days at two concentrations LC₅₀ and LC₉₅ were conducted. Results revealed that Ecotech-Bio was more toxic than Dipel-2X after 7 and 14 days at LC₅₀ and LC₉₅ on *S. oryzae*, *S. granarius* and *R. dominica*.
- 4-*R. dominica* adult at LC₅₀ and LC₉₅ was highly susceptible is (Ecotech-Bio 10% EC) followed by *S. granarius* and *S.* showed the same trend. This results suggested that the two formulations of (B.t.) have excellent contact activity against adults of stored product insects *S. oryzae*, *S. granarius* and *R. dominica* and has potential for use as a general surface spray to control insects in stored wheat.
- 5-The effectiveness of treatment with Natural Oil for the protection of wheat grain seeds against the *S. oryzae*, *S. granarius* and *R. dominica*, was determined through laboratory tests. *S. oryzae* adult were more sensitive to the Natural Oil than *S. granarius* followed by *R. dominica* at LC₅₀ and LC₉₅ after 7 and 14 days from treatment.
- 6-The effectiveness treatment with thiamethoxam (Actra 25% WG) for the protection of wheat grain seeds against the *S. oryzae*, *S. granarius* and *R. dominica* was determined through laboratory tests *S. oryzae* adult were more sensitive to the thiamethoxam (Actra 25% WG) than *S. granarius* followed by *R. dominica* at LC₅₀ and LC₉₅ level.
- 7-The effectiveness of Malathion against three stored product insects during two exposure periods 7 and 14 days. The LC₅₀ values showed that *S. oryzae* adult was more sensitive to Malathion than *S. granarius* followed by *R. dominica*. Also Malathion treated grains at rate of LC₅₀ and LC₉₅ were still effective against the three previous insects.
- 8-The residual studies, the wheat grain were treated with (Tracer 24% SC), (spinosad) Ecotech-Bio 10% EC (*Bacillus thuringiensis*), Natural oil (Natural Oil), Actra 25% WG (thiamethoxam) and malathion 1% Dust and (organophosphate) exposed to *S. oryzae*, , after various periods of storage (1, 15, 30, 45, 60, 75 and 90 days) post-treatment. The results indicated that Tracer, Actra and

Malathion showed an increase in mortality percentage and high a significant reduction in the oviposition rate and adult emergence than that in the control for tested insect at one day post-treatment. While Ecotech-Bio and Natural oil had no effect and were stable. Mortality percentage, oviposition rate and F₁-progeny decreased after 90 days for each tested insect in comparison with that of the control.

9-Joint action studies of natural oil on the toxicity of the tested bioinsecticide revealed that Soybean Oil increased the toxicity of Tracer 24% SC (spinosad), Dipel-2X 6.4% WP (*Bacillus thuringiensis*), Actra 25% WP (thioamethoxan) and Malathion 1% Dust (organophosphorus) on *S. oryzae*.

10- Surface treatment of wheat grain with tested bioinsecticide had no effect on the germinative potential of wheat grain compared with the control. Natural oil had a significant effect on the germinative potential of treated seeds at which seed germination percentage ranged between (75 and 65 %) compared with the control (100 – 95 %). Water absorption did not differ significantly in tested compound treatment or control seeds.