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Investigations on the effectiveness Malathion dust combined with a seed fungicide with or without mercury against the wheat bunt and on the biological activities of the pesticides

S. Erakay* C. Saydam* E. Sezgin* A.İ. Özar**

Özet

Buğdayın civalı veya civasız bir tohum ilâcı ve toz Malathion ile kombine ilâçlamasının buğdayın sürme gücüne ve ilâçların biyolojik aktivitesine etkisinin araştırılması

Ege Bölgesinde tohumluk buğdaylar, Buğday Sürmesi (*Tillletia foetida* (Wall.) Liro)'ya karşı geniş uygulamalarda hasattan sonra fungisidlerle ilâçlanıp depolanmaktadır. Depolarda ekim mevsimi sonuna kadar bu ilâçlı tohumluklarda anbar böceklerinin zararları görülmüş ve fungisidlerle bu böceklere karşı kullanılan toz Malathion'un kombine ilâçlamanın etkilerini araştırma nedeni ile konu ele alınmıştır.

Lermo-rojo-64 çeşidi tohumluk bugday, önce % 0.3 oranında sürme sporları sonra % 0.05 toz Malathion, % 0.2 oranında Dithane M-45 ve programin dozları ile ilâçlanmıştır.

Çalışmalar Hububat Hastalıkları ve Anbar Zararlıları laboratuvarlarınca yürütülmüştür.

Kombine ilâçlama buğday sürmesine karşı % 100 etkili bulunmuş ve 8 ay depolamada buğdayların sürme gücüne olumsuz etkisi görülmemiştir.

Anbar zararlıları yönünden de karışım ilâçlar istenilen koruyuculuk sınırlarını göstermiştir. Bununla beraber Dithane M-45 + toz Malathion kombinasyonunun, Malathion + Programin'le olan kombinasyonuna göre anbar zararlılarına karşı daha iyi sonuç vermesi ve Programin'in sıcak kanlılara olan zehirleyici etkisi göz önüne alınarak Dithane M-45 + toz Malathion ile kombine ilâçlanmış buğday tohumluklarının Programin kombinasyonuna tercihan 8 ay süre ile depolanabileceği tesbit edilmiştir.

* **Regional Plant Protection Research Institute Bornova — İzmir.**

** **Regional Plant Protection Research Institute Diyarbakır.**

Introduction

In the Aegean Region, harvesting of wheat generally starst in June. Seed treatments against wheat bunt that is observable every year in this region are usually applied one or two days before sowing.

However, since the seeds recently distributed by favor of the government necessitated a greated amount of application, the treatment had to start earlier. This problem brought is the problems of storing the treated seeds and applying chemicals against the stored grain pests.

In this research the combinations formed by the chemicals used against wheat bunt and stored grain pests have been tested for their effectiveness on the biological activities of the chemicals and seeds.

Material and methods

The variety, Lermo-rojo-64, that is of Mexican orijin found as a susceptible variety to bunt and stored pests previously was used in these trials (Bora and Karaca, 1968; Saydam et al., 1974).

As the inoculum source for artificial inoculations of the bunt, chlamydospores, that were obtained from the diseases grains collected from different parts of the Aegean Region and found to be *Tilletia foetida* (Wall.) Liro under microskobic examinations were used.

The germination ratio of the chlamydospores were 92 % in 2 % glucose solutions after 72 hours.

Twenty-four groups of Lermo-rojo-64 were used in these studies and each group were 4 kgs. The grains were first artifically inoculated with 0.3 % inoculum by shaking for 5 minutes in a 10 litre container.

After separating the control groups, the seeds were treated the same way (each replication separately) with the chemicals whose names and levels are given on table 1; and the following studies were done.

Table 1. Chemicals and their dosages used in the treatment

Common name	Active ingradient (%)	Levels 100 kg seeds / product (g.)
Malathion dust	2 Malathion	50
Dithane M-45 WP.	60 Mancozeb	200
Programin dust	2.7 Phenyl mercury asetat 1.5 mercury	200

I. Investigations on the effect of fungicides and dust Malathion combinations against on the main stored grain pests.

A. The effect of the combinations against the granary weevil *(Sitophilus* granarius (L.)), the Lesser Grain Borer *(Rhyzopertha dominica* (F.), the confused flour Beetle *(Tribolium confusum* (Duv.)) under the laboratory conditions.

1 kg. samples in cloose bags for each group were kept in the laboratory during the studies, and the samples were protected against the attacks of the stored grain pests with a Malathion belt, fifty grams were taken from each sample and put into the jars with fifteen *S. granarius, R. dominica* and *T. confusum.*

The alive and dead insects were counted after six days, and the biological effect of the chemicals were found according to the Abbott formula.

These studies were carried on monthly till the effect of Malathion decreased to less than 70 %.

On the other hand, after the calculation the jars were kept in an incubator at 26°C and 60 % R.H. for 2 months and insects were observed monthly to study their ability to reproduce under experimental conditions.

B. Under storage conditions

2.5 kgs of the test material which is devoted to the Stored Grain Pest Laboratory were put into a heavily infested villager storage in small canave bags according to the testing design of randomized parsels with 6 characters and 4 replications on June 30, 1970 at the village of Kaklıç-Menemen (İzmir).

The number of alive and dead insects were counted in 100 cc samples taken monthly until the effect of Malathion decreased to less than 70 % and the effect was found according to the Abbott Formula.

Furthermore, at the end of the trial in order to evaluate the percentage of damage, the percentage of damaged grains was calculated with 3 replications in samples taken from the miniature bags. After wards F test was applied to the obtained variants.

II. The effect of the combined chemicals on the germination of seeds and against bunt.

A. The effect of the combinations on germination

The germination tests was applied in 0.75 x 1.75 x 0.25 m wooden boxes by using sieved river sand sterilized with Methyl Bromide (100 cc/m^3),

The trial was designed as randomized parcels with 6 characters and 4 replications. The seeds were sown with a proper sowing machine and irrigated equally with intervals. The 12 days old seedlings were counted in order to find the percentage of germination of the seeds. These studies were repeated with 30 days intervals till the effect of Malathion decreased under 70 %.

B. The effect of the combinations against bunt

The trial started on Jan. 8, 1970 according to the randomized blocks design with 6 characters and 4 replications (in 4 m^2 parcels) to determine the effectiveness of the combinations against bunt.

The temperature of the soil 5 cm. below the surface was 9.2°C (4.6-13.3) in January when sowing took place. All of the ears were cut on May 12, 1970 and the number of infected and healthy ears were calculated.

These results were evaluated according the Abbott formula to find the percentage of effectiveness of the chemicals and the statistical analysis was applied.

Results and discussion

I. The effect of the combined chemical against the main stored grain pest:

A. The effect against *S. granarius*, *R. dominica* and *T. confusum* adults under laboratory conditions

The effectiveness of the dust Malathion, Programin + Malathion, Dithane M-45 + Malathion and Programin and Dithane M-45 against *S. granarius*, *R. dominica* and *T. confusum* are shown in fig. 1.

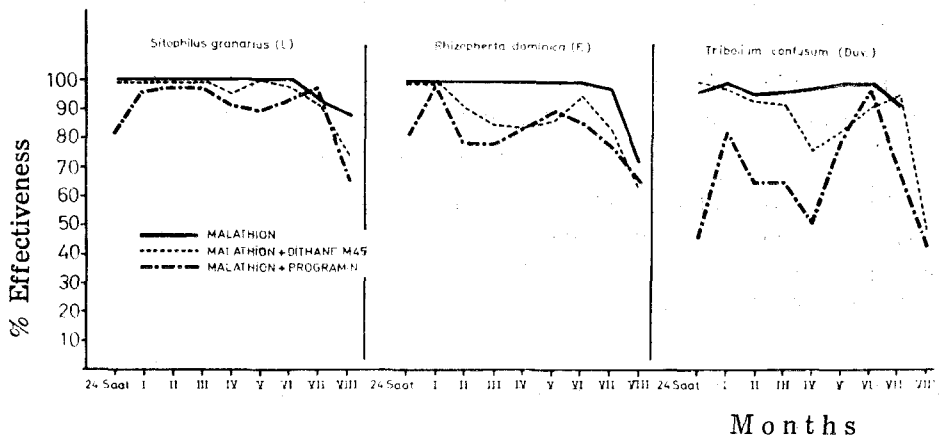

Fig. 1. The monthyl average of the effectiveness of Malathion and its combinations with Programin and Dithane M-45 against S. *granarius*, R. *dominica* and T. *confusum* after 24 hours and until 8 months

According to the these results, the effect of dust Malathion (control chemical) on the granary weevil and the lesser grain borer was found to be 100 % during the first six months. For seven months the effect was higher than 95 % for confused flom beetle. However, the effect of the chemical on all these three stored pests has shown a decrease at the end of eight months.

The effect of the combined treatment of dust Malathion and Dithane M-45 against the granary weevil was 95 % during the first seven months.

The effect of the combination on the lesser grain borer and the confused flour beetle were over 84 % and 80 % respectively within the same period.

The effect decreased to 70 % in the eighth month. The effectiveness of the other combination (Programin + dust Malathion) against the granary weevil and the lesser grain borer have shown effect higher than 89 % and 78 % during the seven months.

The effectiveness of the some combination on the confused flour beetle was about 51 %.

Decreases were observed on the effectiveness of the combinations after 8 months of storage.

On the other hand incubation ability of these insects were observed on the treated and untreated seeds.

The studies have shown that the treatment with dust Malathion inhibited the incubation ability of the insects during the trial (8-months).

The incubation ability of the insects was observed in the seeds treated only with dust Malathion and combined with Dithane M-45 and Programin. The studies have shown that the incubation ability was inhibited by using only Malathion for a period of 8 months.

On the other hand the new incubations have not occured on the treated seeds for the first four months.

Germinations were observed in the same seeds treated with the combination of dust Malathion with Dithane M-45 with Programin between the fifth and eighth months respectively.

The new generation of the confused flour beetle did not occur.

B. The effect against stored grain pests under storage conditions

The average effects of Malathion and its combination within a period of 8 months calculated on miniature bags placed in infected villager storage are shown in fig. 2.

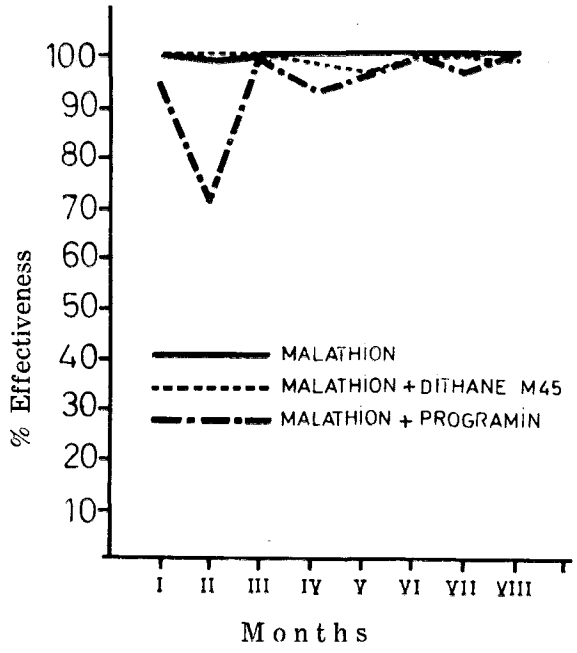

Fig. 2. The 8-month averages of the effectiveness of Malathion, Dithane M-45 + Malathion and Programin + Malathion on miniature bags under storage conditions

During the 8 months, Malathion dust has been 100 % effective whereas the combination of Dithane M-45 + Malathion 99.3 (97-100) % and the combination of Programin + Malathion 93.6 (69-100) %.

In this trial Programin alone has been 39 (9-70) % and Dithane M-45 alone has been 65 (31-84) % effective.

Chemicals have been grouped according to the «Duncan» test taking into consideration the percentages of damaged grains. Malathion and Dithane M-45 + Malathion have been placed into the first group, Dithane M-45 and Programin + Malathion into the second, Programin into the third and control into the fourth group.

II. The effect of chemical combinations on the emergence ability and common bunts of wheat.

A. The effect on emergence ability

Within a period of 8 months the emergence ratios of the characters that are treated with the chemicals have been equal to the ratio of the control group.

B. The effect on wheat bunt

In the plots that are treated with Programin and Dithane M-45 or with their combinations with Malathion, wheat bunt was not seen; and it was found that these chemicals are 100 % effective against wheat bunt. In plots where seeds treated with Malathion are sown wheat bunt average was observed to be 23.4 % (15-30.1), whereas, in the control was 32.7 (23-42.3) %.

Researches have shown that in the Aegean region seeds that are treated for protection with 0.2 % Dithane M-45 + 0.5 % Malathion and with the combinations of Programin + Malathion of the same levels can be stored for a period of 8 months providing an effect against stored grain pests and wheat bunt and not having a negative effect on the ratio of emergence.

It is believed that Dithane M-45 + Malathion combination should be preferred to Programin + Malathion combination since the first combination has been more effective against stored grain pests, and its damage ratio has been different from all the others except Malathion and mercury has a toxic effect against the warm blooded.

Summary

In the Aegean Region, the wheat seeds were applied with the fungicides against Wheat bunt (*Tilletia foetida* (Wall.) Liro)) after harvesting and than they were stored. In the storages the grain pests were damaged to the wheat until the end of the sowing season. For this reason, in this study the combinations formed by the chemicals used against wheat bunt and stored grain pests have been tested for their effectiveness on the biological activities of the chemicals and seeds.

The wheat seed variety Lermo-rojo-64 were treated with the wheat but spores 0.3 %, Malathion dust 0.05 %, Dithane M-45 0.02 % and Programin respectively.

The studies were carried out by storage pests and Field Crop Diseases laboratories.

These combinations were 100 % effective against wheat bunt and the germination of seeds, but it was not different in treated and untreated blocks during 8 months.

On the other hand, combinations gave good results for stored grain pests in the same period. Dithane M-45 + Malathion dust combination is more effective than Malathion + Programin which was an toxic effect on warm blooded. It was also found that the wheat seeds treated with Dithane M-45 + Malathion dust combination could project the wheat seeds against storage pests for a period of 8 months.

References

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